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XXXIV

REGULATION AND THE MANAGEMENT OF PUBLIC UTILITIES

REGULATION
AND THE MANAGEMENT OF PUBLIC UTILITIES

BY

CHARLES STILLMAN MORGAN, Ph.D.

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PREFACE

This series of books owes its existence to the generosity of Messrs. Hart, Schaffner & Marx, of Chicago, who have shown a special interest in trying to draw the attention of American youth to the study of economic and commercial subjects. For this purpose they have delegated to the undersigned committee the task of selecting or approving of topics, making announcements, and awarding prizes annually for those who wish to compete.

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The present volume, submitted in Class A, was awarded second prize in that class.

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AUTHOR'S PREFACE

Thoroughgoing public control of individual initiative and of the rewards of business enterprise, while a phenomenon of comparatively recent origin, is destined to extend itself as public necessity requires. There is need, therefore, for some statement of principles which shall govern the functioning of this control. Public necessity — the public welfare — alone is the ultimate determinant of the form which these principles should take, but public necessity may in some cases appear to be given recognition when in fact it is denied. Mechanical rules, general disregard of the problems and efforts of business men and their organizations, in short, a failure to distinguish personalities, may result in a certain facile solution of the problem of control, but in no sense do these simple expedients solve that problem. The problem is a human one and cannot be resolved in mechanical terms.

Public regulation of public service corporations affords the best opportunity for a study of this problem, since in that field the elements of the problem are most clearly outlined and most fully developed. While, then, the general problem of public control of business enterprise is fundamentally the one attacked in this study, the study itself has been made specifically in terms of public utilities. It is hoped that the reader will bear in mind the broader applications of the principles and concrete facts here developed.

The principal conclusions reached as a result of this study are that public necessity requires, in the case of public utilities, the establishment of conditions which will specifically conduce to the maximum utilization of the agencies or means of production, and that these conditions shall be such as stimulate and reward management, rather than capital as such, for superior efficiency.

In order to make the treatment as real as possible to all classes of readers, an effort has been made to supply a background of facts as they exist to-day in the field of public utility operation and regulation. It is also to be borne in mind that the elements of the problem treated are fairly simple and uniform of nature, if they are not such as permit of ready application in practice, and that a discussion of, for example, the sliding-scale device or of certain aspects of "service-at-cost" in fact embraces essential elements of general application, whatever the particular situation in which they occur. For this reason the treatment of some subjects has been made as complete as reasonable limitations of space permitted.

This study by no means accomplishes a solution of the problem it centers upon. There is need for much further discussion and research, and, above all, for practical experimentation with alternative methods. We have failed to experiment in any real manner in the regulation of public utilities, yet without adequate experimentation we shall continue methods or practices which, it is thought, are demonstrably harmful.

Certain aspects of the problem here discussed were brought to my attention by the late Dr. E. B. Rosa. Much assistance, both as to content and manner of presentation, has been received from Dr. John Cummings, of Washington, D.C. To these, my wife, and others from whom advice and assistance have been received, I wish to offer my sincere thanks.

Charles S. Morgan

Washington, D.C.
October 3, 1922

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REGULATION AND THE MANAGEMENT OF PUBLIC UTILITIES

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CHAPTER I

INTRODUCTION

The Control of Initiative

The present treatise is devoted to a study of the management of a regulated industry. Its principal objects are the determination of the efficiency with which this industry is conducted and of the causes accounting for the degree of efficiency attained, as well as the critical examination of various measures which are used, or have been proposed, for the purpose of eliminating certain latent germs of inefficiency which the industry itself and the regulation to which it is subject may be said to produce. It is hoped, also, that certain constructive suggestions may be made which will advance the solution of a problem which is thought to be of vital and increasing importance.

The historical development of public control of individual business initiative, itself an interesting and fruitful inquiry, does not enter into the present treatise. Nor is any attempt made to outline the probable future course of this development. It may, however, reasonably be assumed that regulation is extending itself and will continue to extend itself as public necessity requires. This fact lends increasing interest and deepening significance to the problem under consideration.

Not only is the analysis confined to the present day and the immediate or predictable future, but, as stated, it is confined to a single industry or type of industry. Public utilities, or public service corporations, as they are sometimes designated, to which attention is confined in this treatise, have, of all types of business enterprise, been longest subjected to thoroughgoing public control. The control of other forms of business undertaking has usually not gone further than the establishment of certain minimum standards of business conduct to which the individual enterprise must conform.[1] The regulation of public utilities has gone very much further than this and has, as is developed at a later point, reached the point where there is actual public participation in the management of such enterprises. This impingement of public authority on individual enterprise is a most unexpected, though in large measure necessary, result of a system of regulation which has grown up somewhat blindly and inadvertently in answer to an ever-urgent public demand for protection from real, potential, or imaginary exploitation.

Critique of Regulation

Formal, administrative regulation as it is known and practiced to-day may be said to have passed through and beyond its experimental stage. It undoubtedly is here to stay and, if so, it must expand to meet the ever-increasing demands placed upon it. The general point of view maintained throughout this study is that regulation is of substantial benefit to all parties in interest, but that it is not without its shortcomings, some of which are serious and bode ill for the future. It is felt, therefore, that the time is opportune for a critical examination of the accomplishments of regulation, with a view to the better guidance of its future course of development.

This essay is not, however, of sufficient scope to furnish, in every respect, this critique of the established system of regulation. There are many legal, financial, administrative, technical, and engineering problems which would come within the purview of such a broad analysis. Valuation, the effects of regulation on the form and amount of capitalization and investment, rates and rate structures, service, the personnel of commissions and their staffs, these and many other aspects of regulation would repay exhaustive analysis. None of these aspects of regulation is, however, of such fundamental and compelling importance as that to which attention is chiefly confined in this study. The success of regulation may be said to depend in very large measure on the development of means whereby efficiency can continue to be developed and retained in the public utility business. Anything short of this can lead only to an enervating stagnation, and ultimately to public ownership.

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[1] Cf. bank inspection, pure food laws, even regulation of "trusts."

The essence of the problem of regulation is the securing of adequate service of the public at a reasonable cost. What adequacy means in this connection is, for the most part, a technical problem; it does involve, however, certain sociological considerations, such, for example, as the effect of various rates of fare and various types of rapid transit construction upon congestion of population and location of industries. The elements of cost are the day to day operating costs, as commonly defined, and a return on the value of the property devoted to the service of the public. There is relatively little difficulty in determining the kind, although not the amount, of items that may be treated as proper operating costs. There also has been ample discussion of the basis upon which the return is computed, although as yet there has been no definitive statement of the principles of valuation which will compel general acceptance. The present treatise is devoted to an analysis of the element of return, to which, in the past, too little, and almost no sustained, consideration has been given. The two problems, valuation and the return thereon, require, both in theory and practice, to be considered together, although they permit of independent analysis. Their interrelationships are developed at some length in a later chapter.

It may be said, however, that while attention is principally given to the study of the effects of regulation on efficiency, it has been impossible to avoid touching upon and to some extent enlarging upon the various other aspects of regulation referred to in a preceding paragraph and to other related aspects of the subject. This treatise, so far as it is successful in accomplishing its avowed purposes, is therefore a searching analysis of what is considered to be the most determinative aspect of regulation and to some extent a commentary on certain of its collateral aspects.

Meaning of Efficiency in Economic Sense

Despite the fact that the thought in this study centers principally upon the promotion and maintenance of efficiency in the management of public utilities, no attempt is made, here or elsewhere, to develop a concise definition of the word "efficiency." Efficiency has never been defined satisfactorily outside of the field of the physical sciences and even in that field it is defined in ideal terms under unreal conditions. To the physicist efficiency is the ratio of useful work done to the energy expended. Any attempt to carry such a concept as this over into the field of the economic sciences would be both barren of results and decidedly misleading and harmful.[1] For input here means the commitment of natural and human resources, in varying proportions, to the production of an *evaluated* product. Here it is not maximum physical output per unit of energy expended, but maximum value output, *i.e.*, the output that will result in the largest net return to the directing or employing agency that is, at least under the present economic order, the end professedly desired.

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[1] It is interesting to note, in passing, that when writers on economic subjects do use the word efficiency, usually without defining it, it connotes much of what the physicist means by it. Thus discussion of the relation of wages, standard of living, hours of labor, education, etc., to efficiency, is usually in terms of output per unit of effort expended under the varying conditions indicated. In such discussions, however, man is looked at as a machine through the eyes of management. The problem of production itself is not reached.

This brief statement of the meaning of efficiency in the economic sense, involving as it does the so-called "paradoxes of value," is, however, tempered somewhat in the case of unregulated business by the force of competition. In the case of public utilities, regulation, and, to a lesser extent, competition, effect a degree of accommodation of the public weal to this searching for the maximum return. In fact, it is this very effect of regulation, desirable though it be, that gives rise to the problem about which this study centers. Restraint of individual gain-seeking, in the very process of accomplishing certain results, produces others which are less to be desired.

Limitations of Treatment

It is perhaps unnecessary to state that in this study it is possible to consider only the economic aspects of a problem which is, after all, in large measure technical and engineering in nature. So far as possible use is made, for illustrative purposes, of technical and engineering criteria and experience. Often strictly economic analysis is perceptibly weakened through a lack of sympathetic understanding of the why's and how's of business and engineering practice. Nevertheless, the point of view throughout is that of the economist. It also need not be stated that no attempt is made to set forth ways and means of assisting utility managers in operating their plants more efficiently. This study is devoted to an analysis and evaluation of the economic forces which play on the management of public utilities and make it more or less efficient. It is therefore addressed primarily to the regulator and to students of public utility and economic problems, and to utility managers only in so far as they are interested in an analysis of the play of conflicting economic forces upon their own motives and interests.

This is, in fact, in large part an essay in that growing body of literature which has to do with economic motivation, of which the works of Veblen, Parker, Taussig, Cooley and Fisher are outstanding examples. The method of treatment followed perforce takes one into many different fields of economic analysis, from its statistical and financial expression on the one hand, to its psychological or motivistic expression on the other. This breadth of treatment has lent both interest and difficulties to the problem and has made it impossible to make this study distinctly a contribution to either the statistical or the motivistic field. The present treatise involves the first turning up of a rich field of research. Later studies of particular aspects of the central problem here discussed are not only possible but urgently needed.

It also is to be remarked that this study is limited to public utilities in the narrow sense, excluding railroads and other interstate carriers. It will be found, however, that what is learned with respect to central electric stations, gas companies, water companies, telephone companies and electric railways, the "local utilities," is applicable for the most part to those utilities whose field of activity is broader.[1] Use is made of some of the material to be found in railway cases, as the problem treated in the case of local utilities has also presented itself in the case of railroads and some attempts have been made to do constructive thinking on it in that field. The greater territorial spread of steam railroads, the multiplicity of regulating agencies, and the greater extent to which competition does, and always will, enter as a factor in their management, add great difficulties to the problem in their case. It is hoped that at another time the analysis developed in this study may be applied, with the necessary modifications, to the general field of railroad transportation.

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[1] It is difficult to draw a sharp line between a local utility and one that is not local. At one time local utilities could be defined as utilities producing and selling in one community, but recent developments in nearly every utility field, resulting in expansions and interconnections between communities, have made this too narrow a basis of distinction. Local utilities are here treated as those over which municipal or state regulation exists, including certain of those over which this regulation is by sufferance of the federal regulatory agencies.

And while the results of this study cannot be without bearing upon the problem of public ownership, no attempt will be made directly to point out the application to that field of the principles here developed for the privately owned and operated utility. It should be recognized, however, that public ownership is not to be discussed and weighed solely from the point of view of productive efficiency. Thus Dr. E. E. Lincoln's exhaustive statistical study of Massachusetts electric lighting plants[1] is partially inconclusive in so far as it fails to view municipal ownership in a broad way as an expression of certain latent tendencies of the people to take to themselves the control of all agencies which are felt vitally to affect their welfare. Nevertheless, adopting Dr. Lincoln's hypotheses, full acceptance may be granted his principal conclusions. These conclusions, which may be stated in a general way as being that experience with municipal ownership of electric lighting plants in Massachusetts has shown that such plants are appreciably less efficient than similar plants privately owned and operated, do much to emphasize the importance of the problem under discussion in this treatise. If private management is to be kept in the harness as being, even under regulation, more efficient than public management, then any unnecessary bridling or checking of its actions must be done away with and every possible inducement offered it to cause it to put forth as much energy of high productive quality as is possible under that minimum degree of restraint that is considered necessary. It also is a gratifying sign that public utility economics at last has so thorough a study of one of its most persistent problems as that furnished by Dr. Lincoln.

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[1] *The Results of Municipal Electric Lighting in Massachusetts.* Houghton Mifflin Company, 1918.

It may also be remarked that this study is pursued with American conditions principally in mind. Some use has been made of English material, but in general the economic, legal and other institutions of Europe are so different from those obtaining in this country that little is to be gained by attempting to draw upon European utility experience.

Efficiency of Public Utilities a Problem of National Efficiency

Public utilities occupy a prominent position in any analysis of national efficiency. Their importance in this respect arises in part from their magnitude,[1] and in part

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[1] The following brief summary indicates how extensive the utility business of the country has grown to be:

	Central electric stations 1917 [1]	Gas companies (artificial)	Electric railways 1917 [2]	Telephone companies 1917 [3]
Property investment.........	$2,933,016,941	[4] $4,000,000,000	$5,136,441,599	$1,435,912,142
Net capitalization..........	$2,804,269,910	..	$4,889,962,096	$1,077,162,311
Number of companies........	4,224	[4] 978	943	2,200
Operating revenues (or value of product)...	$462,473,917	$227,730,638	$709,825,092	$363,831,921
Number of employees.......	94,679	[4] 71,015	294,826	244,490
Consumption of coal (tons)....	[6] 21,826,894	[7] 22,121,879	10,083,779	..
Consumption of oil (barrels)...	[6] 6,158,219	[5] 20,045,910	1,312,270	..

[1] Census of Electrical Industries, Bureau of the Census, 1917: *Central Electric Lighting and Power Stations.* Figures given are exclusive of municipally owned plants.

[2] Census of Electrical Industries, Bureau of the Census, 1917: *Electric Railways.*

[3] Census of Electrical Industries, Bureau of the Census, 1917: *Telephones.* Figures given apply to companies having annual income of $5000 or more.

[4] Estimate of American Gas Association for year 1920, *American Gas Association Monthly, December, 1920.*

[5] McBride, R. S. *Artificial Gas and By-Products in 1917–18*, United States Geological Survey, *Mineral Resources of the United States*, 1919, part II.

[6] Includes municipal plants.

[7] Includes an estimated portion of coal used in coke-oven gas production.

Statistical information of the above character is not available in the case of other classes

from the fact that, through serving other industries, directly or indirectly, they contribute to an essential and expanding national need. The dependence of other industries and of the nation itself upon the public utilities of the country was clearly demonstrated and promptly recognized during the late war.

The conservation movement of nearly two decades ago was, in some respects, directed at a similar problem. It represented a protest against waste, against an unproductive use of the nation's resources. So in this study there is no less a protest against waste, the waste of human energy and efforts, of promise, of latent human productive capacity. This form of waste, being far less tangible and demonstrable than that which has occurred in the use of our coal, timber, natural gas, oil and other irreplaceable natural resources, has received relatively little attention, although there has been, especially of late, some interest taken in it. This interest has, however, been limited more particularly to the lengthening of human life, the elimination of bad and the cultivation of good habits, or to the eliciting from a more or less unwilling, uninspired worker of greater effort through various artificial stimuli and restrictions. In the present study the attention is directed more particularly to the problem of securing the complete utilization of the higher order of capacities. That there should thereby result a more complete utilization of all lower levels of capacities is, of course, to be expected.

To be sure, the conservation of our physical resources is an important consideration in the present study, since public utilities represent very large users of coal, oil, natural gas and other such commodities, as a preceding footnote indicated. But, to cite a single illustration, the interest is not in the relative efficiency of steam as against

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of public utilities. There were in 1918 between 7500 and 8000 water companies. The revenues of the municipal waterworks of the 146 largest cities amounted to $81,884,234 in 1918. The production of natural gas is on a large scale; the value of the natural gas production in 1920 was estimated at $153,553,560.

hydroelectric generation of electricity, or in the coal as against the water process of gas manufacture, but in the attitude of mind of those who are responsible for directing the investment funds of the country and in seeing that the proper selection of whichever of these means of production is, in a given situation, the more efficient, is promptly made and full utilization thereafter secured. The attitude of mind is, for us, the all-important thing.

Further, just as the conservation movement, so far as it has borne fruit, will prove of benefit to the general body of people of the present and coming generations, so if attention to the problem of the management of public utilities results in an appreciable addition to the efficiency with which that industry is conducted, there will result a positive, material gain to the general body of consumers and to the public at large.[1] It also should be noted that constant attention to the problem of attaining a high degree of efficiency is a source of added strength to the utilities themselves, for inefficiency and the resulting increase of costs cannot but result in a certain strangling of the industry. This argument is particularly cogent in the case of those public utilities which have to meet the competition of other sources of supply, such as the gas industry in competition with electricity, gasoline and kerosene, or the electric railway in competition with the private and public automobile.

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[1] On the modest assumption that fifty million people in the United States enjoy one or more kinds of public utility service and that their average per capita expenditure for such service is forty dollars, it would take only a small increase in efficiency to bring about a noticeable reduction in expenditures for such service. When account is taken of those expenditures for utility service which are included in the cost of commodities and services purchased, the average per capita expenditure for public utility service, as defined, is probably considerably in excess of forty dollars per annum.

CHAPTER II

EFFICIENCY IN PUBLIC UTILITIES — STATISTICAL AND OTHER EVIDENCE

ARE public utilities efficiently or inefficiently conducted industries? This question is of fundamental importance and must be squarely faced and as definitely answered as the facts of the situation permit.

The Measurement of Efficiency

It is not an easy matter to depict, statistically or otherwise, the efficiency of any type of industry. The obstacles encountered arise not only from the inherent indefiniteness of the efficiency concept itself and the lack of the necessary statistical data, but also from the fact that there are so many variables to be taken into consideration that true cause and effect are with difficulty disentangled. The problem has been somewhat simplified, however, through limiting it to a consideration of the efficiency of the *management* of public utilities. It is not necessary to pass upon the efficiency of the other factors of production — labor and capital — except in so far as good or bad management is reflected in their proper or improper use.

It is to be noted also that efficiency, as a practical matter, can never be judged absolutely, but only relatively. There have been many attempts to measure individual efficiency, national efficiency and the efficiency of particular industries, but upon analysis it will be discovered that such measurements, as their designation necessarily implies, are never in absolute but only in relative terms. Are the people and industries of France efficient? To answer this question German efficiency or that of some other nation must be brought in as a standard of comparison. Is the

English coal industry well organized and conducted? Compare it with the American coal industry. Is the steel "trust" efficient? Compare its costs with those of the independent producers. Efficiency as the ratio between the attainable and the attained defies external analysis; efficiency in this sense becomes a matter of introspection and therefore does not permit of generalization.

Public Utilities tend toward Inefficiency

Are, then, public utilities as a class more or less efficient than other types of industry? For reasons set forth at length in the succeeding chapter, it is felt that there are conditions controlling this industry which, as their cumulative force makes itself felt in increasing measure, render it impossible to expect efficiency of the highest order. These conditions relate principally to the nature of the industry and the effects of regulation — to the non-elimination of the inefficient and the slackening of the efforts of the efficient. In "competitive" industries, on the other hand, there is a constant tendency for inefficiency to give way to efficiency, for high unit costs to give way to lower ones, so that the standard of efficiency is, in a developing industry, a dynamic one. These points are more fully discussed below. The foregoing statement does not, of course, imply either that unit costs are generally calculated in competitive industries or that, if calculated, they are compared. In fact relatively few business establishments know their production costs and an exhaustive search of published material, principally data compiled by government agencies, has shown how meager is our knowledge of these elemental facts of competitive industry.

Comparison with "Competitive" Industries

Cost studies have been made in certain limited fields by the United States Tariff Commission and its predecessor, the Tariff Board, and during the late war the Federal

Trade Commission made a large number of such studies for its own use and for the use of the various special price-fixing agencies.[1] These were mostly confidential in character. Those which are available, including, for example, those relating to coal, book paper, newsprint paper, shoes and leather, are, of necessity, limited in their usefulness for our purposes, either as being restricted to a single year or two, thereby showing none of the effects produced by change, or as covering too few establishments. It is to be noted further that the effect of natural conditions, such as the thickness of the seam, depth, etc., in the case of the mining industry, and the effects of location, fertility, and other natural conditions in the case of the admirable studies of farm costs made by the Office of Farm Management and Agricultural Economics of the Department of Agriculture,[2] render it impossible to isolate the effects of management, *per se*, from out of the mass of other conditions controlling the production costs of individual producing units.

There is introduced, however, as furnishing a background for discussions of costs in the public utility field, a representative set of cost statistics for a manufacturing industry.[3] For the reasons set forth above, this permits of no generalizations respecting the influence of management on costs.[4] That this factor is an extremely important one has, however, long been recognized by students of business philosophy and duly appreciated by the general

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[1] For a list of the subjects reported on see Garrett, P. W., *Government Control over Prices*, 1920, p. 382.

[2] See, for example, Bulletin No. 943, *Cost of Producing Wheat on 481 Farms*, etc., by Cooper, M. R., and Washburn, R. S., 1921, and *Cost of Producing Cotton*, 1918.

[3] Table I, Cost of production of paper in 39 principal book-paper mills, 1915 and 1916.

[4] The Federal Trade Commission, at page 14 of the report from which this table is taken, said: "The wide variation existing in the costs of the principal book-paper mills is due not only to differences in efficiency but also to differences in the grades and specifications of book-paper manufactured."

Table I. Cost of Production of Paper in 39 Principal Book-Paper Mills arranged by Groups according to Cost per Ton, 1915 and 1916[1]

Group	1915					1916				
	Number of mills	Tons produced	Percentage of total	Cumulative percentage of total[2]	Average cost per ton	Number of mills	Tons produced	Percentage of total	Cumulative percentage of total[2]	Average cost per ton
I. $50 and less than $55.....	5	116,718	18.10	18.10	$52.19	..	..	..	..	..
II. $55 and less than $60....	4	147,094	22.81	40.91	57.03	6	210,639	27.27	27.27	$57.38
III. $60 and less than $65....	12	176,527	27.37	68.28	62.05	5	136,463	17.66	44.93	63.92
IV. $65 and less than $70....	8	85,112	13.20	81.48	67.51	1	35,838	4.64	49.57	67.45
V. $70 and less than $75....	4	57,038	8.85	90.33	71.85	8	128,040	16.57	66.14	72.58
VI. $75 and less than $80....	4	50,971	7.90	98.23	77.11	9	112,919	14.62	80.76	77.88
VII. $80 and less than $85....	2	11,442	1.77	100.00	81.51	4	92,380	11.96	92.72	81.77
VIII. $85 and less than $90....	..	..	..	..	..	4	33,732	4.37	97.09	87.62
IX. $90 and over...	..	..	..	..	..	2	22,521	2.91	100.00	95.57
Total.....	39	644,902	100.00	..	62.24	39	772,532	100.00	..	69.87

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[1] Federal Trade Commission, *Final Report on Book-Paper Industry*, August 21, 1917, p. 67.

[2] This column does not appear in the report itself.

public in this country.[1] In fact, one may fairly say that there is general agreement among economists on the following points: (a) that, for each industry, — such as the manufacture of shoes, automobiles and watches, the production of wheat, etc. — there is, at a given time, a characteristic distribution of production costs; (b) that there are relatively few producing at the highest costs and relatively few at the lowest costs; (c) that the producers whose costs are low tend to expand at the expense of the producers with higher costs; which implies (d) that there is a constant change in both the make-up and the ranking of the individual establishments, some steadily rising in rank, others falling and disappearing, while few find it possible to remain stationary for any considerable period; and (e) that there is a tendency for the average production cost steadily to fall, except in so far as natural conditions preclude this, and until a reasonably stationary level of cost is reached, which cannot be further lowered unless some fundamental change in the arts takes place. The rate at which the relatively inefficient producer will be eliminated depends, of course, on the character of the market, whether an expanding or a contracting one, and on the character of the industry itself, the fundamental determinant being whether it is characteristically one of increasing or of diminishing returns.[1]

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[1] Thus Professor Taussig, when called upon by the chairman of the price-fixing committee of the War Industries Board to express his preference for either the single price or the variable price method of price regulation, opposed the latter in the following words:

"(1) If differences in cost of production between different producers were —

(*a*) Clearly ascertainable;

(*b*) Due solely to differences in the natural resources utilized by them, it would not be impracticable to purchase from them at prices based on their differing costs. As a matter of fact, neither of these conditions is ever present. In the first place, costs are not clearly ascertainable. . . . In the second place, differences in cost are by no means due solely to differences in natural resources. They arise very largely from differences in skill, energy and efficiency. To pay a low price to a producer who has brought down his costs through skill and ability is to penalize the most effective form of human effort." Garrett, *ibid.*, p. 385.

Similar views were expressed on this occasion by Professor W. C. Mitchell and R. H. Montgomery.

The General Distribution of Efficiency among Public Utilities

If it be granted, for the time being, that conditions are inimical to the attainment and maintenance of a high degree of efficiency in the public utility industry, is the effect produced one of a general depression of all utility undertakings, or one of individual variation, some establishments tending to attain and maintain a high degree of efficiency, some a very moderate degree, while others sink to a very low level of efficiency, with the result that the general level of efficiency is lowered?

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[1] A very helpful illustration of the argument here advanced, if, indeed, proof be needed, is furnished by the method of price regulation quite generally used in this country during the war, i.e., the fixing of a maximum price. As stated above, cost studies were made for this purpose, although it appears that in other instances an equally satisfactory result was accomplished by rougher means. There was developed the now familiar "bulk line" method of price regulation. This method is discussed by Professor Taussig in "Price-Fixing as seen by a Price-Fixer," *Quarterly Journal of Economics*, Februaıy, 1919, pp. 205–41. The three interesting diagrams there reproduced give one a cross-section or photographic picture of the distribution of costs in certain selected industries (bituminous coal in southwestern Pennsylvania, beet sugar, and Douglas fir timber). As Taussig states, "the marginal or price-determining producer was found at the point where from 80 per cent to 90 per cent of the output was included. As a rule a price was fixed which would 'protect' four-fifths or nine-tenths of the entire output" (p. 219). But, Taussig adds, this maximum price was probably greater than the long run "normal" price. In other words, in this period of quick expansion of industry a vast number of relatively inefficient producers were called in. With the contraction of industry in a subsequent period these were the first establishments to be eliminated from competition.

The "bulk line" method is almost wholly unknown in the utility field. That it, or rather the idea behind it, is applicable there will be shown presently and also it will be demonstrated that the use of it, properly tempered with restraint and consideration of long-run consequences, would produce wholesome effects.

In so far as the conditions to be described in the following chapter are permitted to produce their full effect, there can be no question as to the consequent effect upon the general efficiency of the public utility industry. But there are still many respects in which these conditions are not a controlling factor, as will be developed at a later point, and of course various types of human capacity react differently to the same set of external conditions. There is still opportunity for and much evidence of a high order of efficiency in particular public utility undertakings. The second of the alternatives stated above appears, therefore, to afford a better explanation of the existing situation. The public utility industry is one which tends to accumulate a relatively excessive number of partially or wholly inefficient plants.

What statistical or other proof of this broad generalization can be given?

The most conclusive form of proof, obviously, would be found in the establishment of a "standard of efficient performance" and in a rating of individual establishments by this standard. In competitive industries it is possible, where natural factors do not figure too largely in explaining relative production costs, to assume that the efficiency of that producer or group of producers whose costs tend generally to be the lowest represents the maximum degree of efficiency attainable in that industry in the given period. Production for a common market requires that the conditions of that market be met. Of these competitive tests the most compelling, and in fact fundamentally the only one, is ability to produce and sell at the prevailing market price. All peculiarities which size, location, natural disadvantages, custom and tradition produce must be effaced, just as an individual, suddenly thrust into a changed environment, must, if he is to achieve success, lay aside all personal peculiarities except such as are a source of strength. The leveling down of these differences tends, therefore, to leave efficiency of management as the principal determinant of relative costs. It may be noted, in further elucidation of the point here made, that differences in the productivity of natural resources as between various producers do not affect the producer who uses the commodities produced, usually in a raw state, by others; it is the individual producers of such commodities who must bear the burden of the relative infertility of the natural resources which they use. It may be noted also that, for our purpose, the form which this efficiency of management takes is a matter of no concern. It may show itself in any of a number of forms — exploitation of patents, of labor, etc. — and yet satisfy the conditions which are described above.

No Single Basis of Comparison Possible

No such rough standard of measurement as that which is found in competitive industry is possible in the case of public utilities, and, if possible, it would not have that compelling influence which it has in the competitive field, since the very existence of a utility plant producing at the higher levels of cost is in no way jeopardized by the fact that a like utility in a near-by community is producing at a much lower cost. In other words, differences in local conditions — size, character of population and industries, topography, etc. — and differences in the kind of service rendered make it impossible to apply a single standard by means of which to gauge the efficiency of individual undertakings. A company which is generally reported to be very efficient, as for instance a company generating electricity at Niagara Falls, which has attained a ninety per cent efficiency, "said to be the highest efficiency ever attained in the world," or the New York Edison Company, which produces electricity at a cost of about one and one half cents per kilowatt hour, cannot be set up as the standard by which the efficiency of all other electric generating stations of the country are to be measured. The efficiency of these companies may be, but is not necessarily, the highest attainable under the conditions existing at Niagara Falls or in New York City, taking into consideration the effects of production on a large scale for a densely populated community and the proximity to coal mines in the case of the New York company, and the use of the unequaled natural advantages of Niagara Falls in the case of the other company. The other variable, the quality of the service rendered, is even more troublesome. In the case of gas companies there is the variable introduced by differences in the heat quality of the gas furnished, and in the case of electric railway transportation the quality and quantity of the service rendered differ greatly from place to place. In the case of all classes of public utility there is the equally important, although less obvious, difference in the service rendered which arises from the fact that in some places the outlying districts or other relatively unprofitable forms of demand are not as fully met as they are in others. There can, therefore, be no single standard; a multiple standard, one that will reflect the effect of local conditions and differences in the quality of the service, is required. To the possibilities of developing such standards attention is given in a later chapter.

Measurements of Efficiency must be on a Relative Basis

While, then, some "standard of efficient performance" is especially needed in the case of public utilities, since by means of it inefficiency could be consciously sought out and overcome, no such single standard is possible, at least under present conditions. It is necessary, therefore, to fall back upon "relative efficiencies," or the distribution of certain criteria or indices of efficiency over a given group of units or individual utility undertakings, in order to sustain the contention here made that the public utility industry is one which is characterized by a relatively large number of partially efficient or wholly inefficient producers.

The meaning of the term "relative efficiencies" will be made clearer by the following simple illustration. If six feet were established as the standard of tallness among human beings, then the heights of individuals could be expressed in absolute proportions of shortness or tallness by comparison with the standard established. If, however, a random group of persons were selected and the height of the tallest person, or the average height of the group, were taken as the standard, we should then have a measure of the relative heights of the persons constituting the group. This latter is the sort of measurement contemplated as possible to develop in the case of public utilities.

In a subsequent chapter is given a detailed discussion of the extent and character of the statistical material now obtainable in the public utility field. Only brief mention of the situation will therefore be made here. The statistics now obtainable are wholly inadequate, with few exceptions. They are either pitiably small in volume or incomplete where given in respectable volume, and are totally lacking in uniformity between jurisdictions. Particularly unfortunate is the failure in nearly all the states to put the statistics on a cost basis. The chief difficulties in the way of improving public utility statistics are lack of appreciation of their importance and the large number of statistics collecting agencies, one for each state, which operate independently and with relatively little uniformity of procedure except such as comes from imitation. The only other sources of general statistics are the federal government and, to a limited extent, the trade associations. The statistics of the federal government, principally those of the Bureau of the Census, the United States Geological Survey and the Bureau of Mines, are not intended to cover other than general aspects of public utilities, and those of the various associations, such as the American Electric Railway Association, while reliable in nature, are limited in range and do not permit of one's studying individual companies. The statistics of the several utility syndicates and larger utility companies, while of the greatest usefulness to those compiling them, are, of course, not available for the purpose under consideration.

Comparison on Basis of Certain Physical Factors

In some industries it is possible to compare efficiencies on the basis of a single item, where this is a preponderant element in the cost of production. Thus two coal mines, working under substantially similar natural conditions, could be compared on the basis of the tons of coal produced per man per day. To a limited extent such a comparison of public utility companies is possible. The operations of an established utility are, as a rule, comparatively simple and highly repetitive. They therefore permit of close analysis and, were this the purpose of this study, afford unusual opportunity for the "efficiency studies" of scientific management. Labor and coal costs represent a very large part of the total production costs of any utility, but especially of gas companies, electrical plants generating electricity by steam, and electric railways. With a view to showing what might be done if the necessary statistical material were available, as well as to show some of the difficulties and dangers involved, there is given Table II, showing the average pounds of coal used per kilowatt of electricity produced. These data relate to some twenty-four New York plants, none of which is located in the city of New York. It will be observed that the coal consumption represents from 49.1 per cent to 64.9 per cent of the total production expense in 1914 and from 53.2 per cent to 86.6 per cent in 1918. The consumption of coal per kilowatt hour generated varies from an average of 2.67 pounds to 11.77 pounds in the earlier years and from 2.45 pounds to 17 pounds in 1918. It is of course to be recognized that, from a strictly engineering point of view, the consumption of coal per kilowatt hour generated varies in some fashion with the

TABLE II. AVERAGE POUNDS OF COAL USED PER KILOWATT HOUR OF ELECTRICITY GENERATED[1]

	1918			1914		
Company	K.w.h. generated	Average lbs. of coal used per k.w.h. generated	Ratio of fuel expense to production expense	K.w.h. generated	Average lbs. of coal used per k.w.h. generated	Ratio of fuel expense to total expense
1	488,140	17.00	73.7	480,181	11.77	60.4
2	379,114	13.07	72.2	309,080	9.20	58.1
3	292,520	12.57	60.0	269,000	12.89	59.1
[illegible]	200,262	10.92	61.9	..	..	..
5	340,710	10.89	53.2	[a]342,610	10.00	41.7
[illegible]	473,970	8.62	58.7	470,120	9.03	49.1
7	2,027,396	8.25	80.1	[a]2,147,756	6.85	69.2
[illegible]	1,077,120	7.82	61.5	627,800	8.28	52.6
9	458,755	7.65	62.8	428,409	8.84	56.7
10	366,220	6.90	68.6	225,148	8.90	53.1
11	2,976,285	6.90	73.4	3,065,149	4.41	60.6
12	844,489	6.72	60.6	1,390,071	4.14	56.0
13	1,308,600	5.07	57.6	745,770	5.84	63.8
14	3,170,230	5.00	58.1	[b]1,879,370	6.25	54.1
15	4,871,842	4.75	72.9	2,786,954	4.64	64.9
16	2,279,785	4.58	68.4	[a]1,904,676	4.09	56.4
17	7,793,219	4.45	59.2	6,947,232	6.54	51.7
18	12,045,331	4.18	78.9	7,785,919	3.37	64.2
19	10,541,600	4.08	72.3	[a]5,756,300	4.61	62.5
20	9,826,600	3.82	71.9	7,554,700	3.79	62.3
21	2,912,635	3.55	56.8	2,202,760	3.17	52.1
22	23,030,260	3.27	63.8	12,489,460	4.86	60.0
23	12,714,758	2.89	65.9	2,554,036	3.90	53.9
24	38,950,588	2.45	86.6	24,847,440	2.67	59.8

[a] 1915. [b] 1917.

Average for above plants and for eight municipal plants not included in the foregoing table:

1918....	150,059,083 k.w.h.	3.87 lbs. of coal per k.w.h.
1914....	89,855,094 k.w.h.	4.45 lbs. of coal per k.w.h.

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[1] *Thirteenth Annual Report of Public Service Commission*, Second District, New York, 1919, vol. 1, pp. cxvi–cxxiv.

size of the plant, the smallest plants being unable to attain as high a degree of efficiency as the larger ones without an inordinate expenditure of money.[1] But the statistics presented by no means show a perfect correlation with size. The conclusion is therefore forced that some degree of inefficiency inheres in the utilization of coal among certain of these plants. The statistics are by no means extensive enough, either in the number of companies embraced or in the period of time covered, to warrant the drawing of any categorical conclusions. The effects of age and style of plant — albeit these very conditions may well reflect the efficiency of the capital investment and the wisdom with which it was made — and of the quality of the coal and character of the labor used must also be accorded their proper weight. The utmost caution must be exercised in using such material as this; to warrant the drawing of any definitive conclusions a close examination of the operation of each plant would have to be made. This material is introduced, therefore, not with the thought that it affords facile support of the proposition that inefficiency is a prevailing characteristic of many utility plants, but that it indicates a kind of approach to the efficiency-measurement problem, an approach from what might be termed an engineering or purely physical standpoint. Within its limitations such an approach is promising. It is therefore the more to be regretted that so few states furnish the material necessary for the calculation of engineering and other similar ratios. Many states give the output data without the coal data and some few the coal data without the output data. Not only this one of fuel consumption, but other purely physical, external or engineering criteria could be developed, which, taken together, would with cumulative strength support or disprove the proposition under review. Such criteria are, for example, the unaccounted for gas, electricity, and water — the loss of product before sale — a very large factor in the case of some utilities, and car miles per man per hour in the case of electric railways. These are, in fact, but a few of the many which would readily suggest themselves to an engineer or efficiency expert.

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[1] The United States Fuel Administration made a survey of the efficiencies of small gas and electric plants during the war and found gross conditions of inefficiency among the smaller plants. A report embodying the results of this survey was not published because of the ending of the war. Here again is seen the need for a classification of utilities, since obviously it is unfair to compare the efficiencies of plants operating under the unlike conditions produced by differences in size.

Comparison on Basis of Unit Costs

There also are given Tables III to VI, in which are set forth certain unit costs of some sixty electric companies and some twenty gas companies. These statistics are taken, with certain adaptations, from the annual report of the Public Service Commission, Second District, New York, for the year 1918, and cover only Class A companies; that is, companies whose operating revenues average in excess of $25,000 per annum. Companies with yet smaller operating revenues would, of course, be extremely small establishments. The electric companies are divided into three classes, those generating by steam, those generating by water, and those purchasing from other companies the electricity which they sell. The gas companies are limited to water-gas companies, it being impossible to compare water-gas companies with coal-gas or other companies. Certain companies shown in the report could not be included in our analysis, either because of the lack of some essential data, such as the amount of fixed capital, or because of the impossibility of classifying them, no one manner of production so predominating as to permit of even a rough classification. Certain further limitations of the material should be made clear. The amount of "fixed capital" shown in the report may be assumed to have been scrutinized by the commission and therefore to represent something other than the companies' own book values. The assumption on our part that six per cent is a proper return on the fixed

TABLE III. UNIT COSTS, ELECTRIC COMPANIES, COST PER KILOWATT HOUR, STEAM GENERATION, 1918, CERTAIN CLASS A NEW YORK COMPANIES[1]

Company	Output (k.w.h.)	Fixed capital (dollars)	"Return" on fixed capital[2]	Production expenses	Trans-mission expenses	Distribution expenses	Com-mercial expenses	Gen'l & misc. expenses	Total operat-ing expenses	Total "cost of prod'n"[2]
			Cents per kilowatt hour							
A	10,707,972	725,131	.400	1.725	.007	.137	.048	.405	2.321	2.727
B	27,523,060	3,097,319	.671	1.392	.074	.232	.173	.704	2.575	3.246
C	2,299,785	163,281	.426	2.068	..	.025	.094	.758	2.946	3.372
D	12,060,771	1,725,456	.806	1.588	.039	.239	.212	.554	2.632	3.438
E	12,972,885	1,669,723	.772	1.674	.114	.251	.174	.596	2.808	3.580
F	4,871,842	269,459	.332	2.372	..	.341	.072	.940	3.726	4.058
G	3,487,450	425,182	.731	1.765	.039	.145	.042	1.505	3.496	4.234
H	2,976,285	562,466	1.073	2.773	..	.302	.150	.467	3.692	4.765
I	2,027,396	353,059	1.045	3.696	..	.239	.180	.888	5.003	6.048
J	473,970	78,091	.991	3.620	..	.127	.567	1.025	5.339	6.330
K	9,846,769	2,063,171	1.257	2.427	.234	.760	.385	1.787	5.644	6.901
L	408,092	182,741	2.687	3.712	.041	.263	.213	1.535	5.765	8.452
M	458,755	67,859	.887	4.036	..	.393	.126	3.197	7.801	8.688
N	1,031,860	301,109	1.669	6.829	(Cr. .007)	.906	.438	1.229	9.394	11.063
O	378,370	70,689	1.121	5.710	..	.598	.275	3.671	10.254	11.375
P	483,140	80,872	.994	9.354	.046	.320	.075	1.795	11.590	12.584
Q	379,114	151,979	2.405	7.372	..	.546	.200	2.189	10.367	12.772
R	292,520	124,560	2.520	10.556	..	1.344	.764	3.529	16.192	18.712

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[1] Data in Tables III to X have been compiled from the *Annual Report, Public Service Commission*, Second District, New York, 1918, vol. III, pp. 40–48, 62–69, 70–73, 92–103, 118–29, 130–33, 149–50, 153–55; 1912, vol. III, 45–50, 60–67, 82–89, 104–17, 129–30, 134–36, 162–69, 174–79, 188–89, 192–93, 199–200.

[2] As stated at page 24, the return on fixed capital is a computed return, not the return actually earned. The total "cost of production" is the sum of this computed return and the total of the actual operating expenses.

TABLE IV. UNIT COSTS, ELECTRIC COMPANIES, COST PER KILOWATT HOUR, WATER GENERATION, 1918, CERTAIN CLASS A NEW YORK COMPANIES [1]

Company	Output (k.w.h.)	Fixed capital (dollars)	"Return" on fixed capital	Production expenses	Trans-mission expenses	Distribution expenses	Com-mercial expenses	Gen'l & misc. expenses	Total operating expenses	Total "cost of prod'n"
			Cents per kilowatt hour							
1 A	1,694,543,810	35,721,705	.126	.065	.004	.001	..	.027	.097	.223
1 B	44,935,100	1,094,758	.146	.021	..	..	..	.074	.096	.242
1 C	400,710,583	10 893 276	.163	.088	..	..	..	.047	.135	.298
1 D	10,577,126	255,376	.145	.204	.015	..	..	.075	.294	.439
1 E	15,798,730	657,128	.249	.047	.002	.048	.025	.263	.385	.634
1 F	32,025,200	1,623,245	.305	.314	.012	.016	.006	.078	.426	.731
1 G	63,816,408	3,954,434	.372	.110	.014	.054	.051	.336	.564	.936
1 H	3,675,860	108,009	.176	.239	.014	.166	..	.416	.834	1.010
1 I	11,367,000	1,661,187	.877	.109	.009	.028	.060	.151	.307	1.796
1 J	6,736,200	760,839	.677	.128	.014	.072	.025	.455	.691	1.368
1 K	2,283,400	567,141	1.489	.058	.009	.028	.060	.151	.307	1.796
1 L	8,729,393	956,419	.692	.265	.033	.215	.068	.791	1.371	2.063
1 M	1,536,109	181,661	.709	.359	..	.410	.080	.922	1.771	2.480
1 N	1,303,600	247,606	1.136	3.597	.023	1.040	.199	1.785	6.642	7.778
1 O	47,538,600	..	..	.131	.004	.037	.008	.083	.262	..

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[1] See footnotes to Table III.

TABLE V. UNIT COSTS, ELECTRIC COMPANIES, COST PER KILOWATT HOUR, ELECTRICITY PURCHASED, 1918, CERTAIN CLASS A NEW YORK COMPANIES[1]

Company	Output (k.w.h.)	Fixed capital (dollars)	"Return" on fixed capital	Production expenses	Transmission expenses	Distribution expenses	Commercial expenses	Gen'l & misc. expenses	Total operating expenses	Total "cost of prod'n"
			Cents per kilowatt hour							
2 A	59,704,183	620,118	.062	.268	.007	.006	.008	.038	.328	.390
2 B	19,160,170	160,856	.050	.431	..	.002	..	.003	.436	.486
2 C	32,834,000	709,499	.126	.486	.033	.072	.020	.192	.804	.930
2 D	56,536,714	715,772	.706	.561	.024	.020	.007	.083	.696	1.402
2 E	3,105,800	124,590	.241	.737	.135	.025	.029	.191	1.166	1.407
2 F	12,175,710	208,285	.147	.761	.080	.111	.016	.205	1.173	1.320
2 G	16,469,129	385,716	.140	1.262	..	.100	.030	.092	1.484	1.624
2 H	18,793,344	926,169	.296	.478	..	.163	.124	.585	1.350	1.646
2 I	2,084,014	53,573	.154	.971	.011	.094	.143	.459	1.678	1.832
2 J	30,729,403	2,528,219	.494	.892	.002	.257	.170	.277	1.599	2.093
2 K	1,445,500	243,501	1.010	1.345	.016	.336	.032	.461	2.244	3.254
2 L	7,058,770	379,141	.322	2.370	.097	.145	.010	.460	3.081	3.403
2 M	2,502,585	262,210	.628	1.578	.123	.219	.145	.762	2. 26	3.454
2 N	593,814	54,121	.546	2.082	..	.174	.410	.320	2.986	3.532
2 O	284,000	42,009	.877	1.583	..	.607	..	.983	3.179	4.056
2 P	1,021,810	106,670	.626	1.896	.168	.203	.161	1.563	3.996	4.622
2 Q	2,525,358	167,269	.398	.917	.156	.056	.039	.161	1.329	1.727
2 R	979,175	55,349	.339	2.577	..	.357	.179	1.322	4.435	4.774
2 S	040,900	112,909	.714	1.905	..	.546	.462	1.338	4.251	4.965
2 T	10,197,318	1,586,703	.934	1.780	.344	1.193	.596	.616	4.529	5.463
2 U	1,075,141	198,902	1.110	4.044	(Cr. .283)	.362	.294	.745	5.162	6.272
2 V	748,960	75,717	.606	3.936	..	.658	..	1.985	6.579	7.185
2 W	2,503,239	562,429	1.348	6.016	..	.597	.276	(Cr. .757)	6.132	7.480
2 X	1,008,150	170,668	1.015	2.131	.213	.518	.061	3.703	6.631	7.646
2 Y	487,537	79,152	.974	4.685	.022	.125	.111	2.841	7.734	8.758
2 Z	476,590	105,061	1.323	2.619	.138	.553	.273	4.127	7.761	9.084

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[1] See footnotes to Table III.

TABLE VI. UNIT COSTS, GAS COMPANIES, COST PER THOUSAND CUBIC FEET, WATER PROCESS, 1918, CERTAIN CLASS A NEW YORK GAS COMPANIES [1]

Company	Output (M. cu. ft.)	Fixed capital (dollars)	"Return" on fixed capital	Production expenses	Transmission and distribution expenses	Commercial expenses	General & misc. expenses	Total operating expenses	Total "cost of prod'n"
			Cents per thousand cubic feet						
3 A	349,806	1,517,309	26.02	49.33	4.33	4.81	12.47	70.95	96.97
3 B	547,248	1,929,287	21.15	57.79	7.16	4.07	9.87	78.89	100.04
3 C	191.222	186,359	5.85	62.48	8.69	12.37	11.86	95.39	101.24
3 D	761,087	2,194,150	17.29	61.59	12.36	5.65	10.00	89.61	106.90
3 E	1,264,328	5,831,403	27.69	58.15	7.08	6.20	10.59	83.02	110.71
3 F	744,564	3,572,455	28.79	66.41	8.26	5.99	15.50	96.16	124.95
3 G	422,829	2,602,767	36.93	67.36	14.15	6.02	1.74	89.28	126.21
3 H	390,886	1,610,428	24.72	61.07	8.32	7.55	25.10	101.83	126.55
3 I	130,977	469,931	21.53	70.37	13.86	4.51	16.35	105.08	126.61
3 J	46,003	173,509	22.63	89.20	6.21	4.32	15.53	115.25	137.88
3 K	61,540	444,715	43.36	71.25	14.17	9.96	20.21	115.59	158.95
3 L	12,261	66,563	32.57	94.02	3.40	11.10	20.05	128.58	161.15
3 M	41,124	239,508	34.94	83.51	7.49	8.57	37.49	137.06	172.00
3 N	73,133	455,393	37.36	96.11	7.05	3.17	31.66	137.98	175.34
3 O	13,392	67,043	30.04	100.33	11.09	10.83	27.01	149.24	179.28
3 P	57,190	321,000	28.46	112.31	22.07	5.56	12.33	152.28	180.74
3 Q	19,549	120,611	37.02	116.41	9.67	..	35.98	162.06	199.08
3 R	15,115	208,212	82.65	95.22	5.02	3.92	39.09	143.24	225.89
3 S	6,506	79,286	73.12	144.21	10.12	16.60	22.84	193.79	266.91
3 T	2,361,148	..	..	55.96	17.33	7.02	10.61	90.91	..

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[1] See footnotes to Table III.

capital is of course purely arbitrary, although a not improper one, as is the assumption that the sum of this return, prorated to the output, plus the total operating expenses per kilowatt hour or per thousand cubic feet of gas, represents the total "cost of production." Because of these assumptions and other adaptations made, the names of the companies are omitted.

Conclusions based on this Comparison

Close scrutiny of these statistics will reveal, aside from certain inherent weaknesses, many interesting and significant conditions. The material is limited both as to the companies included and the period of time covered. Further, it portrays none of the special conditions, such as topography and other natural conditions, size and age of plant, distance over which the product is transmitted, manner of sale (wholesale or retail), or the existence of special contractual situations, such as favorable or unfavorable coal contracts of relatively long duration.[1]

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[1] It is a common belief that public utilities furnish a single, homogeneous service. This belief is entirely in error, for upon analysis it will be found that there are many kinds and grades of service rendered by each class of utility. Thus the central station industry furnishes domestic lighting, commercial lighting and street lighting, power, "on peak" and "off peak" service, hot water or steam heating, etc.; the electric railway has its short-haul and long-haul riders, its on peak and off peak load; water companies furnish water for hygienic purposes and for fire protection. A variety of services is rendered in one indivisible lump. Each class of user furnishes a different demand schedule. In the case of a large industrial establishment, on the other hand, each department or producing unit is expected to be self-supporting and to contribute in as large measure as possible to the earnings of the entire enterprise. Any department paying less than its proportionate cost is abandoned and departments paying relatively less than other departments are contracted while others expand. Public utilities, however, commonly render certain grades of service at a cost greater than the monetary return therefrom. Thus the long-haul rider benefits at the expense of the short-haul rider and the large user of water or electricity under the old flat rate system of charging benefited at the expense of the smaller user. While it is true that graduated rate schedules are being developed in the electric, gas and water businesses and the zone system is being experimented with in the case of electric railway

Despite these drawbacks, which are freely admitted, it is thought that this material is of value, particularly as showing tendencies. Its usefulness in this respect would be greatly augmented if similar statistics for the identical companies for a number of earlier years were presented. There has been added, therefore, similar material for the year 1912,[1] the earliest date for which it was possible to obtain any comparable statistical data. Discussion of this material follows at a later point. While such comparative statistics may seem to a particular company unfair where it believes that it is working under exceptional local conditions, it is well, as a matter of principle and policy, that the burden of proof in all such cases be put squarely upon the company itself, since in no other way can it be learned whether or not the untoward circumstances represent real and uncontrollable conditions or merely imaginary ones behind which lack of initiative conceals itself.

On the positive side these statistics show a remarkable diversity and range of costs. In the year 1918 the capital investment of the steam plants demands a return varying from 0.332 cents to 2.687 cents per kilowatt hour, and the total operating expenses vary from 1.409 cents to 16.192 cents per kilowatt hour. The total "cost of production," as defined for this purpose, varies from 2.727 cents to 18.712 cents per kilowatt hour. The return on the investment for the hydroelectric plants varies from 0.126 to 1.489 cents per kilowatt hour, while the total operating expenses vary from 0.097 cents to 6.642 cents per kilowatt hour, or more commonly to less than 2 cents per kilowatt

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fares, all with a view to the obtaining what is regarded as being a fairer or more scientific allocation of cost, the fact remains that the utility business is of such a public nature and so truly a public necessity that something of the "ability to pay" principle will always inhere in the determining of its rate structures. Large social considerations enter into the rate and development policy of public utilities. The efficiency of a public utility undertaking is therefore to be judged on the basis of the undertaking [redacted] unit, rather than on the basis of its several subdivisions.

[1] Tables VII to X.

TABLE VII. UNIT COSTS, ELECTRIC COMPANIES, COST PER KILOWATT HOUR, STEAM GENERATION, 1912, CERTAIN CLASS A NEW YORK COMPANIES[1]

Company	Output (k.w.h.)	Fixed capital (dollars)	"Return" on fixed capital	Production expenses	Trans-mission expenses	Distribution expenses	Com-mercial expenses	Gen'l & misc. expenses	Total operating expenses	Total "cost of prod'n"
			Cents per kilowatt hour							
C	1,220,000	127,140	.625	1.519	..	.314	.058	.108	2.000	2.625
H	2,869,829	483,978	1.012	.966	..	.105	.037	.552	1.771	2.783
F	2,271,705	139,694	.500	1.165	..	.575	.152	1.368	3.260	3.760
A	1,642,350	234,504	.791	2.078	..	.269	.183	.481	3.010	3.801
N	548,558	213,613	.233	2.686	.004	.568	..	1.089	4.347	4.580
M	393,750	33,974	.518	2.131	.596	.279	.040	1.478	4.529	5.047
Q	263,150	111,793	2.510	2.563	..	.519	..	.167	3.938	6.448
K	6,270,500	1,643,014	1.572	1.816	.361	1.104	.443	2.886	6.609	8.181
B	225,300	90,318	2.409	3.914	..	.399	.163	1.917	6.393	8.802
E	1,397,703	359,769	1.546	4.660	.012	.770	.619	2.028	8.091	9.637

[1] See footnotes to Table III.

TABLE VIII. UNIT COSTS, ELECTRIC COMPANIES, COST PER KILOWATT HOUR, WATER GENERATION, 1912, CERTAIN CLASS A NEW YORK COMPANIES[1]

Company	Output (k.w.h.)	Fixed capital (dollars)	"Return" on fixed capital	Production expenses	Trans-mission expenses	Distribution expenses	Com-mercial expenses	Gen'l & misc. expenses	Total operating expenses	Total "cost of prod'n"
			Cents per kilowatt hour							
1 A	633,607,495	15,765,909	.149	.022	.004	.002	..	.027	.054	.204
1 C	138,331,397	6,393,285	.208	.024	..	..	..	.005	.029	.237
1 F	14,183,524	1,602,324	.678	.039	.019	.023	.012	.060	.203	.881
1 K	2,013,130	167,714	.495	.115	.014	.154	.018	.419	.719	1.214
1 J	2,190,000	587,049	1.609	.549	.003	.264	.073	.647	1.536	3.145
1 N	590,160	135,250	1.375	2.535	.106	.684	.042	2.292	5.799	6.574

[1] See footnotes to Table III.

TABLE IX. UNIT COSTS, ELECTRIC COMPANIES, COST PER KILOWATT HOUR, ELECTRICITY PURCHASED, 1912, CERTAIN CLASS A NEW YORK COMPANIES[1]

Company	Output (k.w.h.)	Fixed capital (dollars)	"Return" on fixed capital	Production expenses	Transmission expenses	Distribution expenses	Commercial expenses	Gen'l & misc. expenses	Total operating expenses	Total "cost of prod'n"
			Cents per kilowatt hour							
2 C	26,021,400	547,127	.126	.535	.026	.057	.005	.066	.689	.815
2 E	2,414,760	87,316	.217	.697	.138	.009	.022	.103	.969	1.186
2 F	6,980,400	182,002	.157	.824	.146	.119	.025	.175	1.290	1.447
2 S	776,877	75,917	.586	.849	..	.185	.014	.523	1.079	1.665
2 D	26,701,194	529,889	1.191	.468	.028	.014	..	.026	.536	1.727
2 J	23,876,130	2,511,994	.631	.902	.003	.003	.403	.230	1.684	2.315
2 J_1	5,129,856	482,245	.565	1.343	..	.124	.055	.337	1.860	2.425
2 G	3,600,227	164 181	.274	1.629	..	.382	.155	.249	2.414	2.688
2 K	1,421,004	221,967	.937	1.563	.004	.618	.087	.358	2.636	3.573
2 K_1	1,338,992	None	..	2.515	..	.468	..	.597	3.579	3.579
2 K_2	14,464,864	1,393,887	.566	1.414	.002	.292	.073	1.372	3.153	3.719
2 Q	657,100	192,265	1.755	1.195	.319	.075	.191	.369	2.150	3.905
2 T	10,597,211	1,007 767	.571	1.645	.239	.608	.327	.603	3.423	3.994
2 L	2,582,918	255,520	.594	2.027	.263	.496	.009	.803	3.598	4.192
2 X	525,722	107,334	1.225	1.720	.049	.264	.021	1.672	3.723	4.949
2 W	2,014,415	489,368	1.457	3.106	..	.663	.319	.397	4.485	5.942
2 V	282,736	39,871	.845	3.500	..	1.765	..	.540	5.805	6.650
2 R	346,405	36,540	.633	2.503	..	1.253	1.407	1.105	6.270	6.903

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[1] See footnotes to Table III.

TABLE X. UNIT COSTS, GAS COMPANIES, COST PER THOUSAND CUBIC FEET, WATER PROCESS, 1912, CERTAIN CLASS A NEW YORK GAS COMPANIES [1]

Company	Output (M. cu. ft.)	Fixed capital (dollars)	"Return" on fixed capital	Production expenses	Transmission and distribution expenses	Commercial expenses	Gen'l & misc. expenses	Total operating expenses	Total "cost of prod'n"
			Cents per thousand cubic feet						
3 B	384,615	1,544,094	23.83	28.62	6.00	3.40	12.49	43.72	72.55
3 D	606,393	2,918,630	28.88	32.90	19.71	5.85	1.69	60.15	89.03
3 E	779,295	5,199,521	40.03	31.08	8.87	9.21	5.36	54.52	94.55
3 H	265,254	1,216,000	27.51	33.59	8.89	8.39	20.05	70.94	98.45
3 H$_1$	61,484	186,998	18.24	51.90	7.58	5.71	19.63	84.84	103.08
3F	448,887	3,066,913	40.99	38.18	11.46	7.59	9.34	66.56	107.55
3 J	33,248	163,852	29.56	47.87	9.45	6.82	18.07	82.21	111.77
3 N	37,237	200,400	32.29	44.97	7.99	5.55	23.86	82.35	114.64
3 Q	17,302	102,214	35.45	50.85	14.10	2.29	24.84	92.08	127.53
3 K	48,234	407,997	50.75	41.79	17.36	9.36	22.98	91.47	142.22
3 M	30,447	149,762	29.51	54.44	14.37	15.62	37.68	122.11	151.62
3 P	35,582	284,448	47.96	74.39	21.61	9.17	25.35	130.52	178.48
3 O	6,087	61,436	60.52	95.86	21.76	1.99	47.55	167.18	227.70
3 C	136,227	..	..	35.56	11.17	17.93	5.22	69.86	..
3 T	1,169,348	..	..	30.84	25.66	7.27	19.39	83.18	..
3 R	7,720	549,951	427.42	113.95	3.48	6.09	49.02	172.54	599.96

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[1] See footnotes to Table III.

hour. The total cost of production varies from 0.242 to 7.778 cents, or more commonly to less than 2 cents per kilowatt hour. The small return per kilowatt hour demanded by the investment in hydroelectric plants as compared with steam plants, apparently in contradiction to general belief, is, of course, attributable to the enormous production of the particular hydroelectric plants in question. The costs of the companies purchasing the bulk of their electricity, which are very numerous in the state of New York, reflect on the one hand the cost of purchasing the electricity, which must be weighed against alternative methods of supply, and on the other hand the cost of distributing or retailing the electricity. In the case of the water-gas companies, the return on the investment, as computed, varies from 5.85 cents, or more commonly from about 20 cents, to 82 cents per thousand cubic feet, the total operating expenses from 70.95 cents to 193 cents and the total cost of production, as defined, from 96.97 cents to 266.91 cents per thousand cubic feet produced.

Inefficiency tends to persist

Only detailed examination of the statistics will reveal which of the items of expense account for the variation and wide range in the total cost of production. Our interest in these statistics attaches to the general view which they afford of the spread of costs between companies. To one who is closely acquainted with the situation in New York state explanations of these differences will readily suggest themselves. These explanations will be of the general character indicated above. It would be presumptuous for any one not entirely familiar with the local situation to base any hard-and-fast conclusions on this limited portrayal of facts. And while it is true that there was likewise a large range of costs shown in the competitive industries, of which a sample is given in Table I, there is this essential difference in the two situations, which, in fact, affords the only conclusive proof of our major proposition. For whereas in competitive industries there are in every particular industry high-cost producers, these, as has been stated above, furnish a relatively small percentage of the output, are extremely unstable in character and tend to change rapidly as the forces of competition exert themselves in varying ways. The inefficient producer must become efficient or perish. If others follow him they only repeat the process and demonstrate the same truth. Is this the situation in the public utility field? By no means. There is no force irresistibly compelling the high-cost producer to get on a lower cost level, unless it be mere desire to survive, which latter, as will be demonstrated in the next chapter, is an uncommon, in fact anomalous, state of affairs in the field of public utilities. The company which is inefficient to-day may well have been inefficient yesterday and ten years ago, and may still be so ten years hence. Inefficiency begets inefficiency, and even efficiency, a fetish with the typical business man in the competitive field, may, in the utility field, give way to an abated efficiency and finally to inefficiency if positive and continuous efforts are not made to overcome the forces pulling it down. This general condition, then, when taken together with the conditions set forth in the next chapter, constitutes, up to this point, the principal evidence supporting our major thesis.

With a view to determining whether the proposition stated above, that "the company which is inefficient to-day may well have been inefficient yesterday and ten years ago," a comparison has been made of the comparative costs of identical companies in the year 1912 with those for the year 1918. Various changes in corporate identity and in the character of the statistical data rendered it impossible to obtain comparable material for 1912 for all of the companies for which 1918 data are available. Enough comparisons can be made, however, to establish the truth of the above generalization. Thus, while a particular company may advance to a higher or fall to a lower position in the scale, in the greatest number of cases there was no appreciable change in the relative positions of the companies and no general tendency toward a general shifting of positions appears. Table XI sets forth these comparisons.

A Final Form of Statistical Comparison

One final form of statistical proof remains. Certain criteria which are principally engineering in nature have been considered, and also statistics of certain unit costs, the number of companies covered being in each case as great as the available material permitted. Emphasis was, in fact, placed on the importance of embracing as many companies as possible in order that the results might be as nearly conclusive as possible. By way of contrast a limited number of companies will now be studied. This method of attack, familiarly known as the method of sampling, has the advantage that it permits of intensive study. If the companies analyzed are ascertained to be representative in all essential respects and the conclusions reached are scientifically correct, it is possible to apply these conclusions *in extenso* and to build up something approaching definitive laws.

Certain Massachusetts electric utilities were chosen for this intensive study because reasonably satisfactory statistics could be secured for enough utilities of about the same size and operating under about the same conditions to warrant the drawing of certain definite conclusions. Eight companies were selected as being the maximum number that could be handled readily and because of limitations of material. Because of certain assumptions and adaptations which it was necessary to make, and because it is not desired to center attention on particular companies but only on types of company, the names of the eight companies studied have been omitted.

TABLE XI. RELATIVE RANKING OF ELECTRIC AND GAS COMPANIES, 1918 AND 1912[1]

Electric Companies									Gas Companies (Water Process)		
Steam			Water			Purchasing					
Company	Rank		Company	Rank		Company	Rank		Company	Rank	
	1918	1912		1918	1912		1918	1912		1918	1912
A	1	4	1 A	1	1	2 C	1	1	3 B	1	1
C	2	1	1 C	2	2	2 D	2	5	3 D	2	2
E	3	10	1 F	3	3	2 E	3	2	3 E	3	3
F	4	3	1 J	4	5	2 F	4	3	3 F	4	5
H	5	2	1 K	5	4	2 G	5	7	3 H	5	4
K	6	8	1 N	[illegible]	6	2 J	6	6	3 J	6	6
M	7	6				2 K	7	8	3 K	7	9
N	8	5				2 L	8	11	3 M	8	10
Q	9	7				2 Q	9	9	3 N	9	7
R	10	9				2 R	10	15	3 O	10	12
						2 S	11	4	3 P	11	11
						2 T	12	10	3 Q	12	8
						2 U	13	14	3 R	13	15
						2 X	14	12			
						[illegible] W	15	13			

[1] Based on Tables III to X.

The statistics used in this study, which are given in Table XII, fall into three groups: (1) general statistics, giving information necessary to an understanding of the statistics indicated under (2) and (3); (2) financial statistics, which are considered to represent particularly the larger and more permanent aspects of efficiency; and (3) managerial statistics or statistics relating not entirely but more generally to the day-to-day efficiency of the undertaking. These last are divided in turn into what are considered to be the two essentials of such management, namely production or engineering statistics and sales or commercial statistics. Low production costs, taken with proper maintenance of plant and good service to the people, and a well-developed sales program as reflected in sales records and a well-developed and profitably distributed load on the plant, are indications of good management. The items in the last two groups, financial and managerial statistics, are numbered and are taken to be "indices" or "criteria" which, not singly but together, do picture the condition of the particular utility under consideration. The twenty-six criteria or indices referred to were chosen because each constitutes a numerical expression of some vital aspect of utility management and all, taken together or by groups, afford a clear picture of the general situation. It is felt that the larger number of items on which the analysis is based answer in their totality a question which none of them individually could answer conclusively.

But as matters still stood these criteria with their various numerical values, some in monetary, others in physical terms, were in unworkable condition because of there being no common unit in which all could be expressed. The next step taken was, therefore, to reduce them all to a percentage basis. But percentage of what — of the average, the best or the poorest? For reasons which will be more fully developed in the later discussion of standards of efficiency,

TABLE XII. STATISTICAL COMPARISON OF EIGHT MASSACHUSETTS ELECTRIC UTILITIES [1]

	Page of report	Company A	Company B	Company C	Company D	Company E	Company F	Company G	Company H
General statistics (descriptive)									
Output of plant k.w.h.	352a	17104915	22385480	16968641	19447646	14053440	11765560	14948833	13664232
Population of territory served	103	108822	102942	133988	129503	114761	134014	133352	37200
Percentage distribution of revenue:	357a								
Commercial lighting %		42.52	41.38	46.14	43.98	66.37	54.85	54.78	44.18
Municipal contract lighting %		12.33	12.59	21.42	17.84	14.90	19.63	16.26	11.99
Commercial power %		40.70	35.37	31.48	37.54	18.73	21.14	28.81	43.04
Municipal power %		..	..	..	..	..	..	..	.48
Sales to other utilities %		3.39	10.46	.96	.44	..	2.71	.15	.31
Miscellaneous %		1.06	.20	..	.20	..	1.67	..	..
Total %		100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Percentage distribution of operating expenses (excluding taxes and depreciation):	361a								
Power		50.21	55.12	44.98	50.99	47.65	40.38	49.99	52.97
Distribution and consumption %		32.26	19.91	28.35	23.62	36.35	35.09	32.34	17.22
Commercial and general %		13.67	21.82	23.85	20.95	9.16	20.37	14.80	25.52
Undistributed %		3.86	3.15	2.82	4.44	6.84	4.16	2.87	4.29
Total %		100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Percentage bonded indebtedness (including notes) of total capitalization %	60a	6.36	16.17	22.22	29.81	0	25.98	24.71	5.36
Dividends paid for year — percentage of capital stock	366a	12.0	8.0	8.0	8.0	20.0	12.0	15.0	10.0
Addition to surplus for year — percentage of capital stock	366a	−1.44	−3.3	.84	10.45	2.8	1.63		2.82
Operating ratio	358a, 364a	57.46	63.41	58.03	63.72	54.51	65.72	62.14	60.59

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[1] Based on *Thirty-Second Annual Report of the Board of Gas and Electric Light Commissioners*, 1916.

TABLE XII. STATISTICAL COMPARISON OF EIGHT MASSACHUSETTS ELECTRIC UTILITIES (*continued*)

	Page of report	Company A	Company B	Company C	Company D	Company E	Company F	Company G	Company H
Financial statistics									
1. Total capitalization per k.w. capacity......dollars	35a, 342a	74.11	162.54	144.00	113.93	127.58	424.40	197.54	62.51
2. Total capitalization per k.w.h. sold......... "	" 358a	.075	.092	.127	.084	.150	.162	.234	.068
3. " " " consumer.......... "	" 346a	184.33	291.17	263.36	261.28	134.69	138.29	485.00	183.25
4. Plant cost per k.w.h. sold................ "	" 358a	.107	.109	.164	.147	.199	.199	.176	.102
5. " " " consumer................. "	" 346a	261.62	347.52	342.12	456.83	179.20	170.11	365.16	276.29
6. " " " k.w. capacity............... "	" 342a	105.18	193.99	165.27	199.21	169.72	522.16	148.73	94.22
Managerial statistics — production (engineering)									
7. Total operating expense per k.w.h. sold .....cents	361a	1.977	1.693	1.597	2.124	2.497	3.202	1.920	1.437
7a. " maintenance " " " " " "									
8. Depreciation " " " " " "	35a	.494	.729	.477	..	.464	.236	.643	.341
9. Sum of above " " " " " "	"	2.471	2.422	2.074	..	2.961	3.438	2.563	1.778
10. Total cost of generation " " generated "	361a	.821	.785	.599	.842	.916	.965	.749	.690
11. Distribution and consumption expense per k.w.h. sold.................................. "	363a	.638	.337	.453	.502	.907	1.124	.621	.247
12. General operation expense per k.w.h. sold......"	364a	.270	.369	.381	.445	.229	.652	.284	.367
13. Undistributed " " " " " "	364a	.076	.053	.045	.094	.171	.133	.055	.062
14. Operating labor per switchboard k.w.h........."	360a	.279	.138	.114	.156	.198	.142	.177	.127
15. Pounds of coal consumed per k.w.h........pounds	360a	2.340	2.492	2.368	2.695	2.847	3.122	2.747	2.537
16. Cost of coal per 2000 lbs..................dollars	360a	3.495	3.931	3.365	4.248	3.321	4.147	3.336	3.663
17. Fuel for steam per switchboard k.w.h..........	360a	.365	.437	.355	.512	.422	.575	.409	.415
18. Percentage of current unaccounted for.........%	352a	17	16	16	22	23	25	22	9
Managerial statistics — sales (commercial)									
19. Lighting consumers per 100 population...........	346a	5.23	5.64	5.09	3.63	10.40	7.75	4.02	12.18
20. Power " " " "	346a	.48	.47	.20	.41	.46	.43	.44	.67
21. Com'l lighting cons. per consumer ....k.w.h...	357a	523	493	404	661	388	279	529	357
22. " power " " " ...."...	357a	17939	20488	34213	18588	8691	5606	12568	39518
23. " lighting " " 100 population ...."...	357a	2756	2778	2057	2398	4047	2161	2132	4391
24. " power " " " " ...."...	357a	8690	9553	6971	7622	4021	2393	5513	26770
25. " lighting " " k.w. connected load ..."...	346a, 357a	481	372	370	344	407	235	460	293
26. Power consumption per h.p. connected load...."...	346a, 357a	758	871	1107	862	584	594	786	1157

it was decided to use the best showing on a particular item made by any of the companies in the group as one hundred per cent. By a simple process of calculation the relative percentages obtained by all of the other companies on the item in question could be found. Table XIII presents the results of these calculations. The best showing being taken as 100 per cent, all of the other percentages are so figured as to be larger in numerical value than 100 per cent. To make the method clear two examples may be cited. Thus item 4, plant cost per kilowatt hour sold, is low if the plant investment is conservatively and carefully made — assuming normal cost conditions in general — and if sales are well developed. Company H has the lowest cost per kilowatt hour sold and is rated 100 per cent. All the other companies' plant costs are expressed in terms of the $0.102 per kilowatt hour sold of company H as 100 per cent and vary all the way from 105 per cent in the case of company A to 195 per cent in the case of companies E and F. On the other hand, in the case of item 19, for instance, a large numerical showing is a good showing and the largest number is taken as 100 per cent. In this case the company with the smallest numerical showing is represented by the highest index number.

Close study of Table XIII will disclose many interesting facts. Thus company H is seen by inspection to be the best on fourteen out of twenty-six counts, while company F is the best on one count only and the poorest in respect to the largest number of points. But such conclusions are difficult to pick out of so extended a statistical summary as is here given, and the following table of rankings, Table XIV, has therefore been prepared.

The best showing on any item is graded 1 and the other showings are graded up to 8, the total number of companies studied. This method is open to the objection that it overlooks the size of the steps between the grades. Thus the company graded 4 in a particular item might be more or

TABLE XIII. INDEX NUMBER RATINGS OF EIGHT MASSACHUSETTS ELECTRIC UTILITIES

Item Number	Company A	Company B	Company C	Company D	Company E	Company F	Company G	Company H	Average
1	118	26[illegible]	230	182	204	679	316	100	261
2	110	135	187	124	221	238	344	100	182
3	137	216	196	194	100	103	360	136	180
4	105	107	161	144	195	195	173	100	148
5	154	204	201	269	105	100	215	162	176
6	112	206	175	211	180	554	158	100	212
7	138	118	111	147	174	223	134	100	143
8	209	309	202	..	197	100	272	144	205
9	139	136	117	..	167	193	144	100	142
10	137	131	100	140	153	161	125	115	133
11	258	136	183	203	367	455	251	100	244
12	118	161	166	194	100	285	124	160	163
13	169	118	100	209	380	296	122	138	191
14	245	121	100	137	174	125	155	111	146
15	100	106	101	115	122	336	117	108	138
16	105	118	101	128	100	125	101	110	111
17	103	125	100	144	119	162	115	117	123
18	189	178	178	244	256	278	244	100	208
19	233	216	239	336	117	157	303	100	213
20	140	143	335	163	146	156	152	100	167
21	125	134	164	100	170	237	125	185	155
22	220	195	115	213	455	705	314	100	290
23	159	158	214	183	109	203	206	100	166
24	308	280	384	351	666	1117	486	100	461
25	100	129	130	140	118	205	104	164	136
26	153	133	105	134	198	195	147	100	146

less than half as poor as the company graded 8. Despite this fact this table is very illuminating. Comment on the conclusions to which it points will be withheld until mention is made of certain graphical representations of these statistics. Table XIV has been set up in diagrammatic form in Chart I. There is given also Chart II, in which the individual company is made the basis of comparison. The comparison in each of the eight diagrams included in this chart is between the respective company and the average for all eight companies.

Conclusions based on this Comparison

From these several statistical tables and diagrams certain conclusions stand out unmistakably. In drawing these conclusions the items in each of the tables and diagrams are weighed collectively. Many of these items, individually, appear to be self-contradictory, and, [illegible] has been pointed out repeatedly before, no simple basis of comparison, even the most general, is sufficient. The conclusions reached may be stated as follows:

(1) There are marked variations in the efficiency of individual companies when compared with one another. This obvious conclusion is best illustrated in the case of companies F and H, which represent the two extremes.

(2) An individual company's efficiency varies greatly from item to item. Thus a company may be efficient in one aspect of management and inefficient in another, or efficient in both, or efficient in neither. Thus company C, for example, makes the best showing on the engineering side, but ranks sixth in sales development and fourth in capitalization and related matters. Company H is the best in all but engineering and is second best in it. Company G is poor in all of these respects and company F is the poorest in two respects and sixth in the third.

(3) No company is (a) the most efficient in every particular, or (b) the least efficient in every particular, but

CHART I

Percentage comparison of eight Massachusetts electric utilities - best company with respect to each item being considered 100 per cent

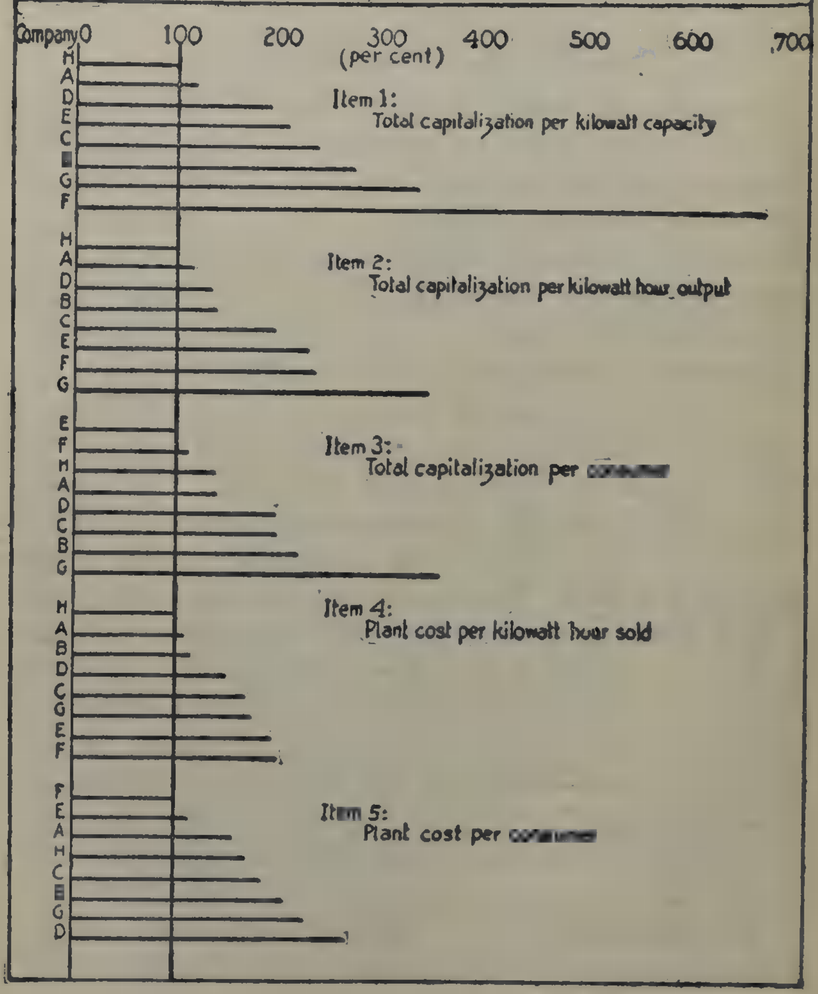


CHART I Continued

Percentage comparison of eight Massachusetts electric utilities - best company with respect to each item being considered 100 per cent

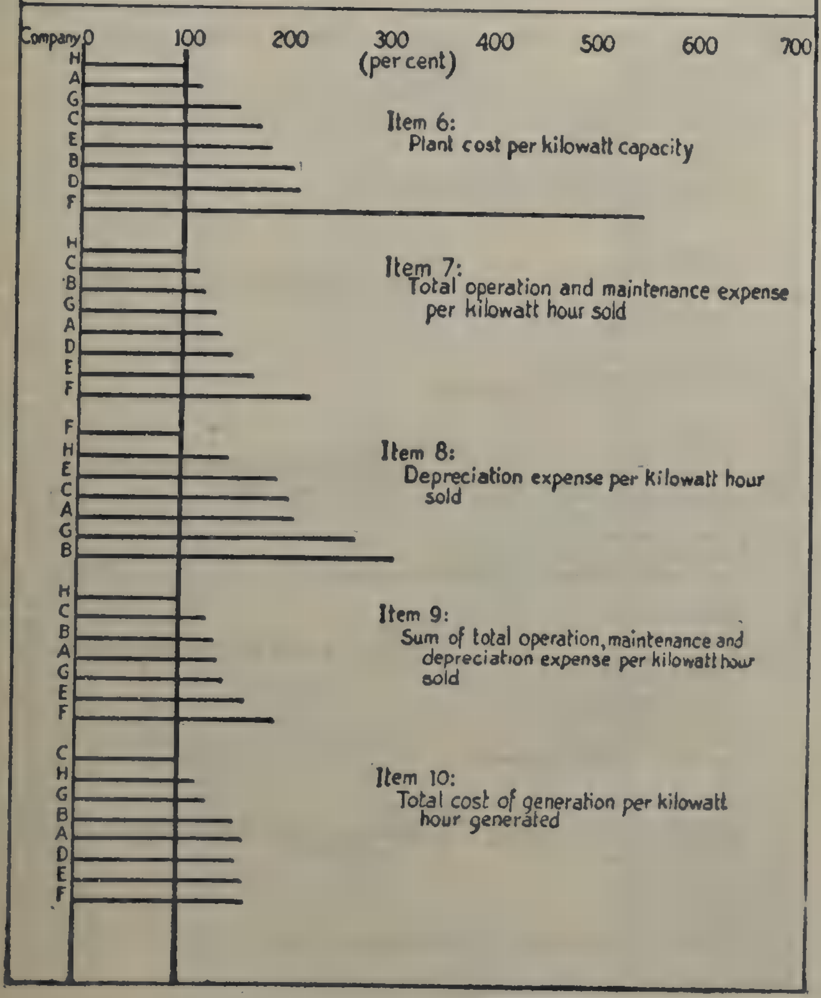


CHART I Continued

Percentage comparison of eight Massachusetts electric utilities - best company with respect to each item being considered 100 per cent.

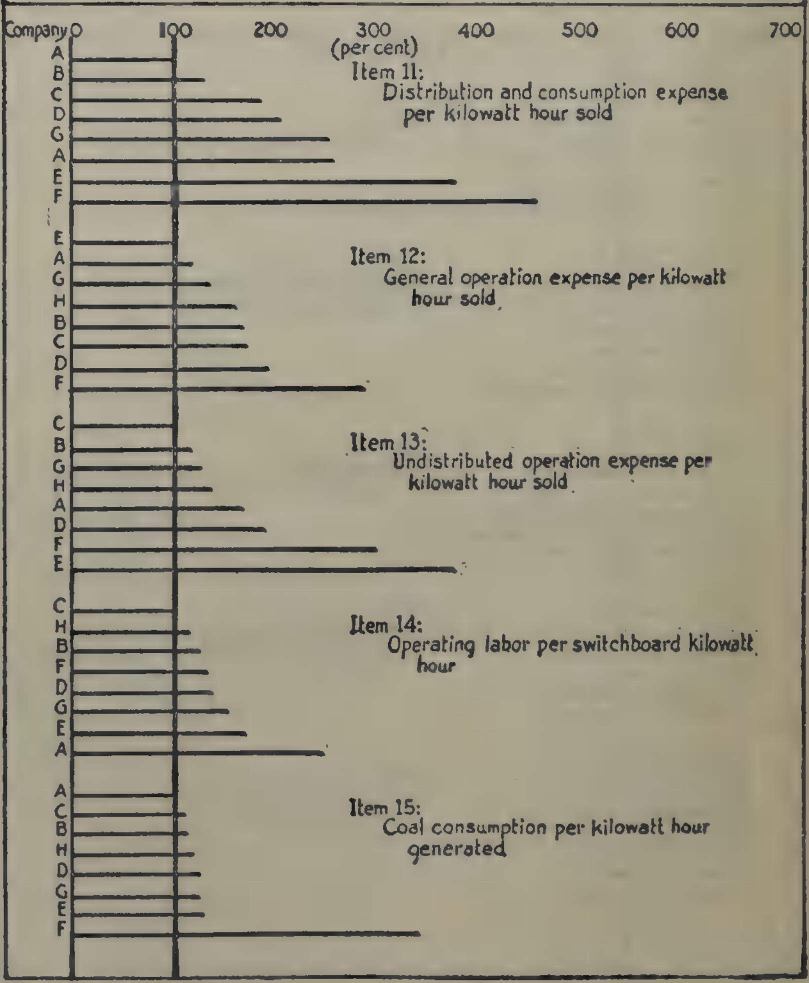
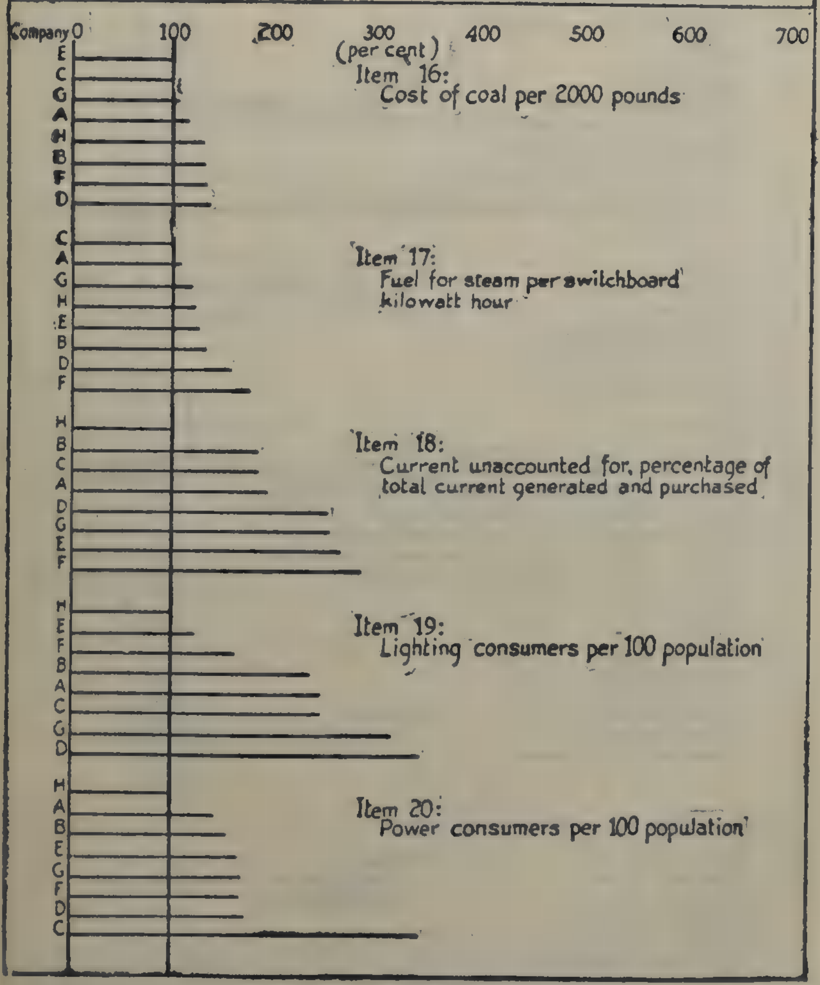


CHART I Continued

Percentage comparison of eight Massachusetts electric utilities – best company with respect to each item being considered 100 per cent



Item 16: Cost of coal per 2000 pounds

Item 17: Fuel for steam per switchboard kilowatt hour

Item 18: Current unaccounted for, percentage of total current generated and purchased

Item 19: Lighting consumers per 100 population

Item 20: Power consumers per 100 population

CHART I Continued

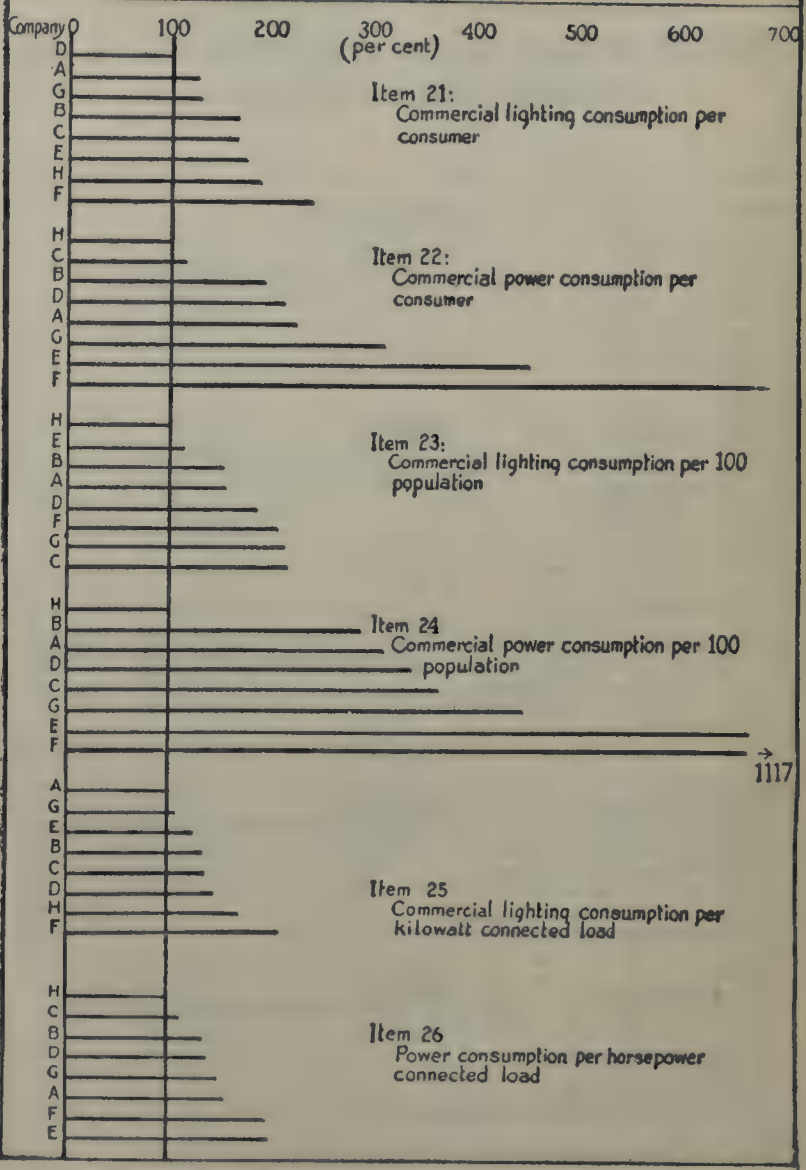
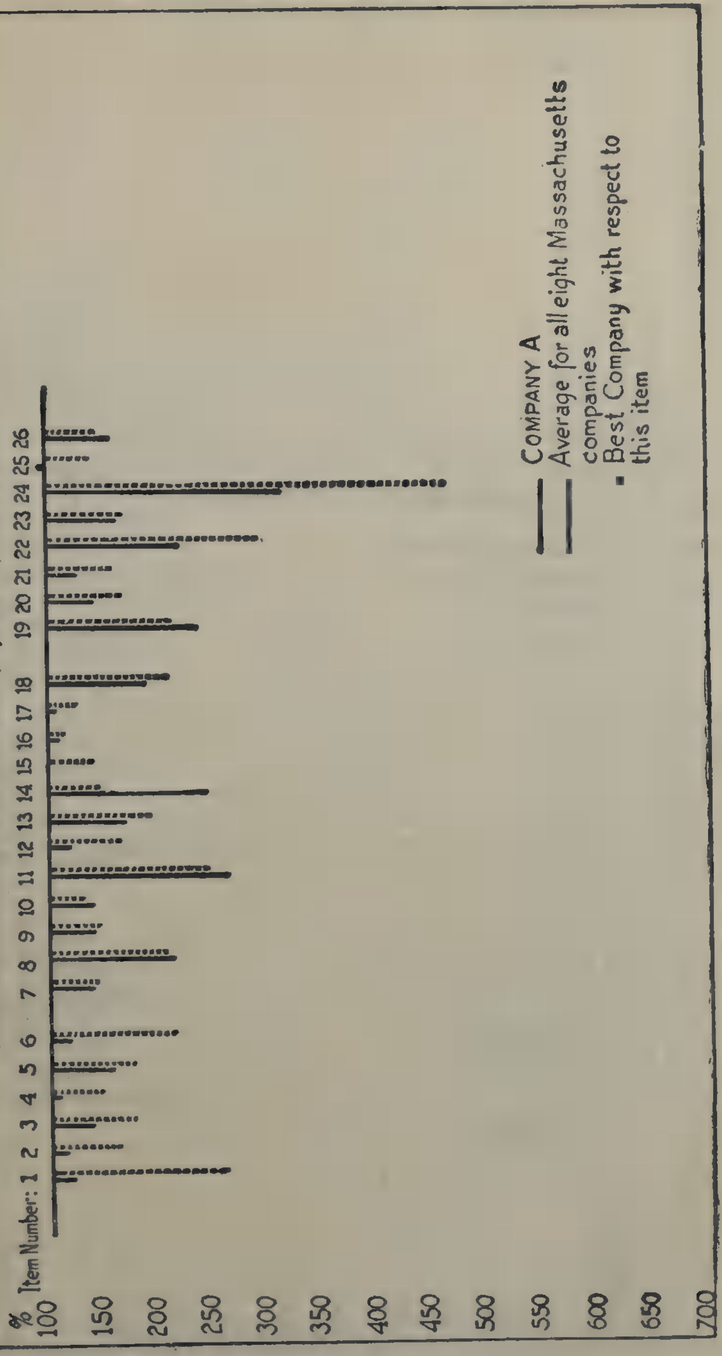


CHART II — PART 1

COMPARISON, ITEM FOR ITEM, OF COMPANY A

WITH THE AVERAGE FOR ALL EIGHT MASSACHUSETTS COMPANIES



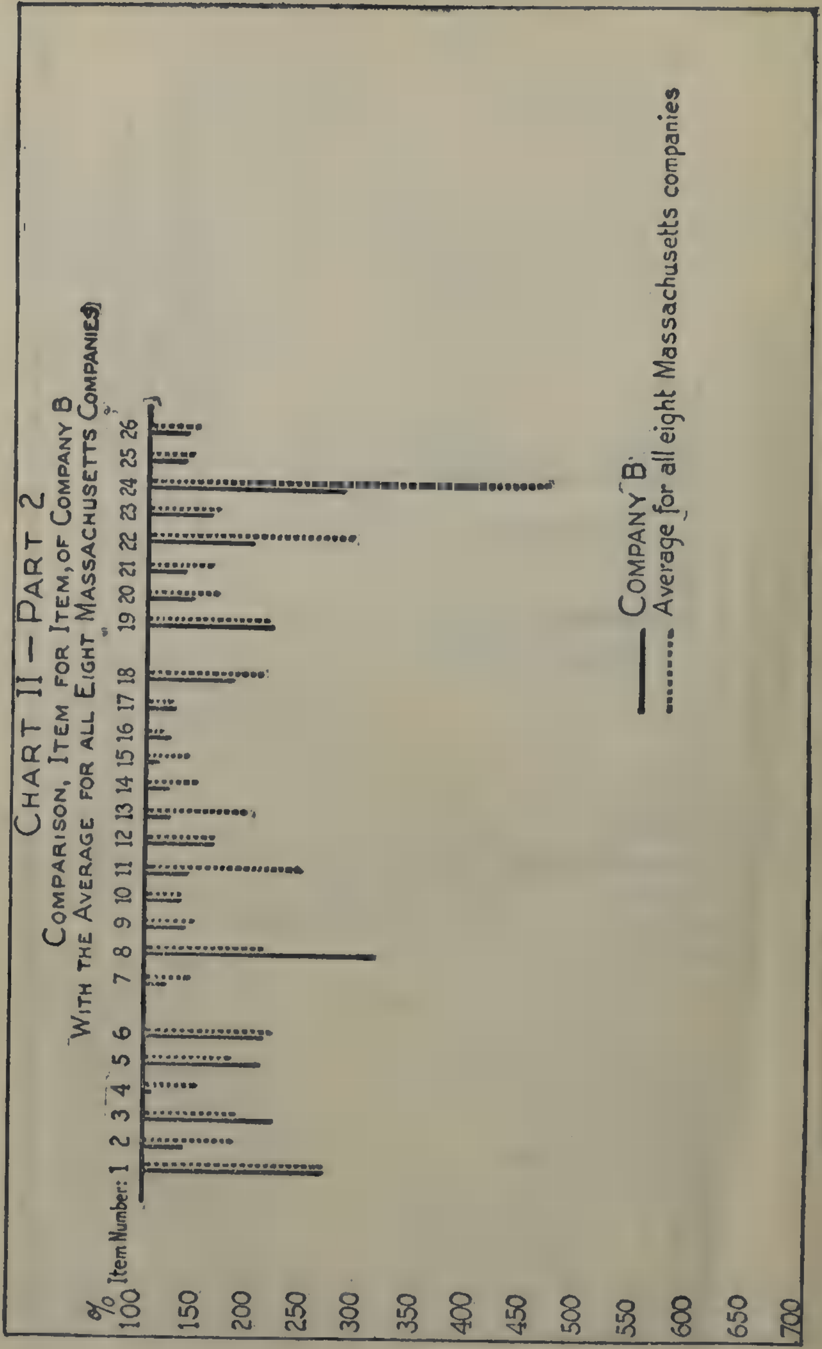


CHART II — PART 2

COMPARISON, ITEM FOR ITEM, OF COMPANY B

WITH THE AVERAGE FOR ALL EIGHT MASSACHUSETTS COMPANIES

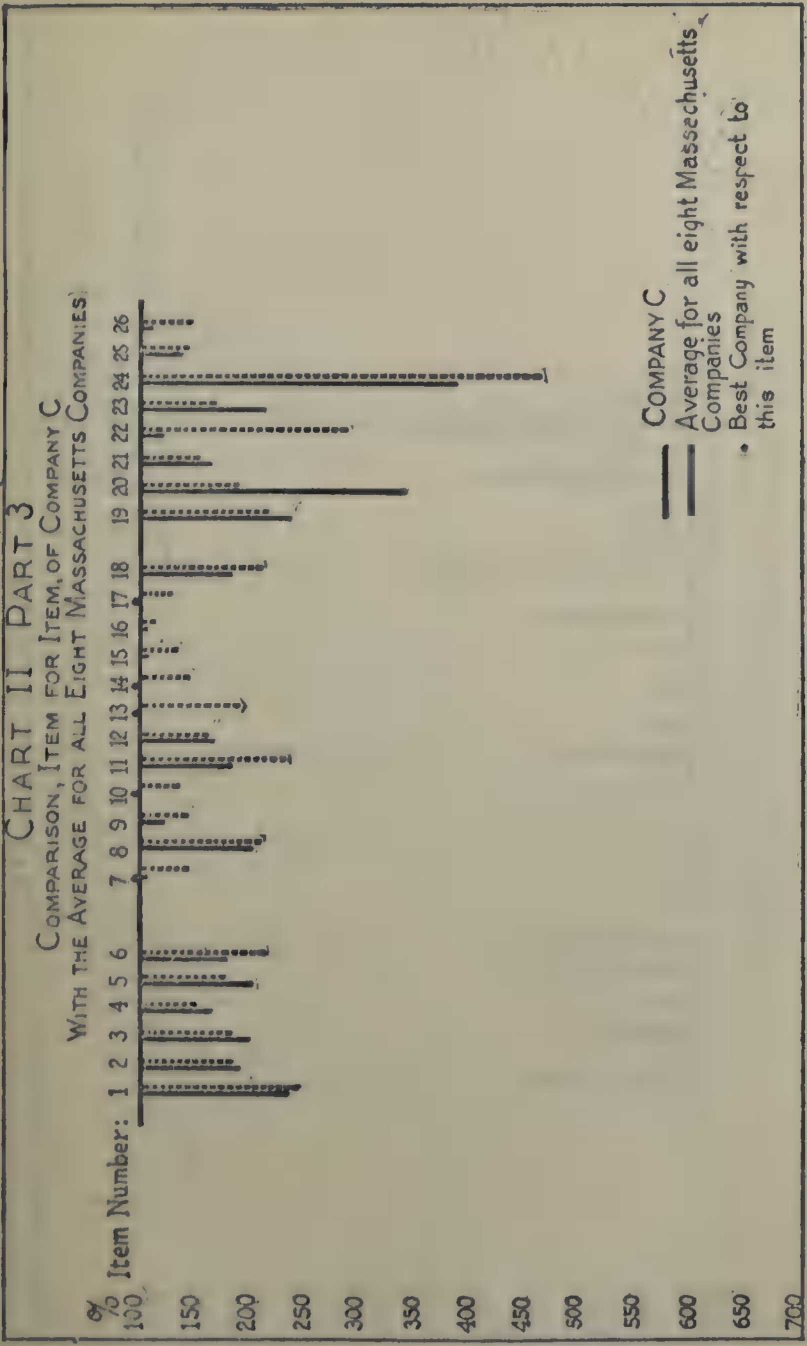


CHART II PART 3

COMPARISON, ITEM FOR ITEM, OF COMPANY C WITH THE AVERAGE FOR ALL EIGHT MASSACHUSETTS COMPANIES

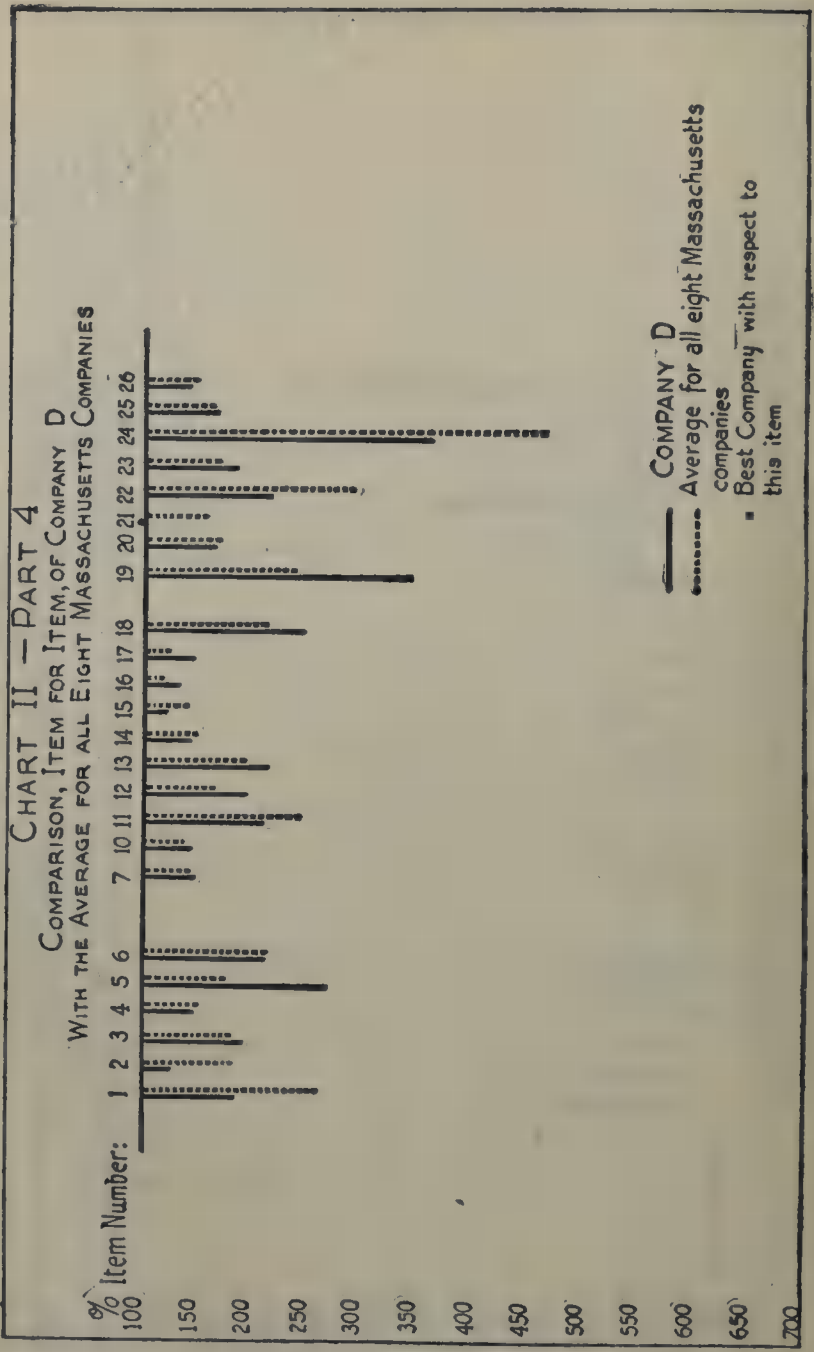


CHART II — PART 4
COMPARISON, ITEM FOR ITEM, OF COMPANY D
WITH THE AVERAGE FOR ALL EIGHT MASSACHUSETTS COMPANIES

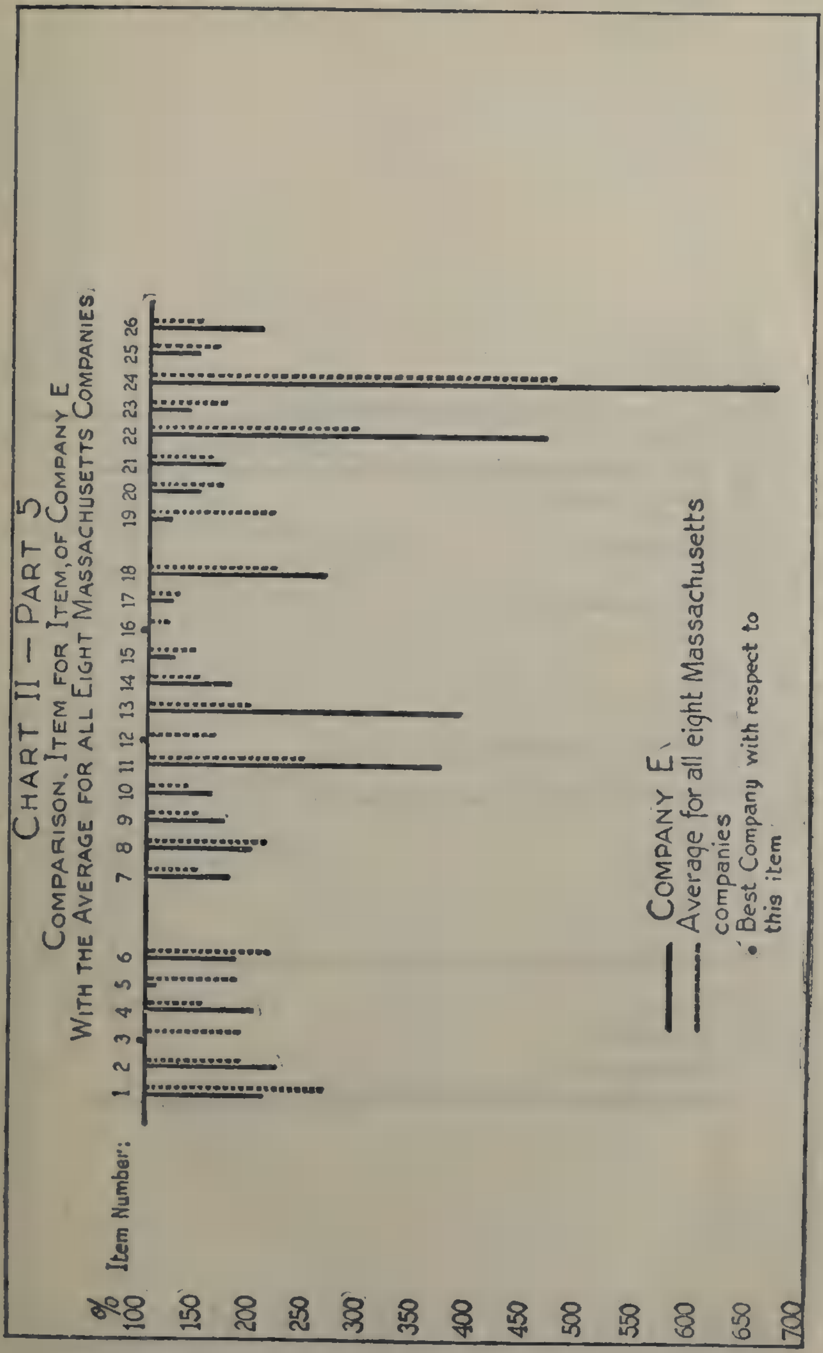


CHART II — PART 5

COMPARISON, ITEM FOR ITEM, OF COMPANY E WITH THE AVERAGE FOR ALL EIGHT MASSACHUSETTS COMPANIES

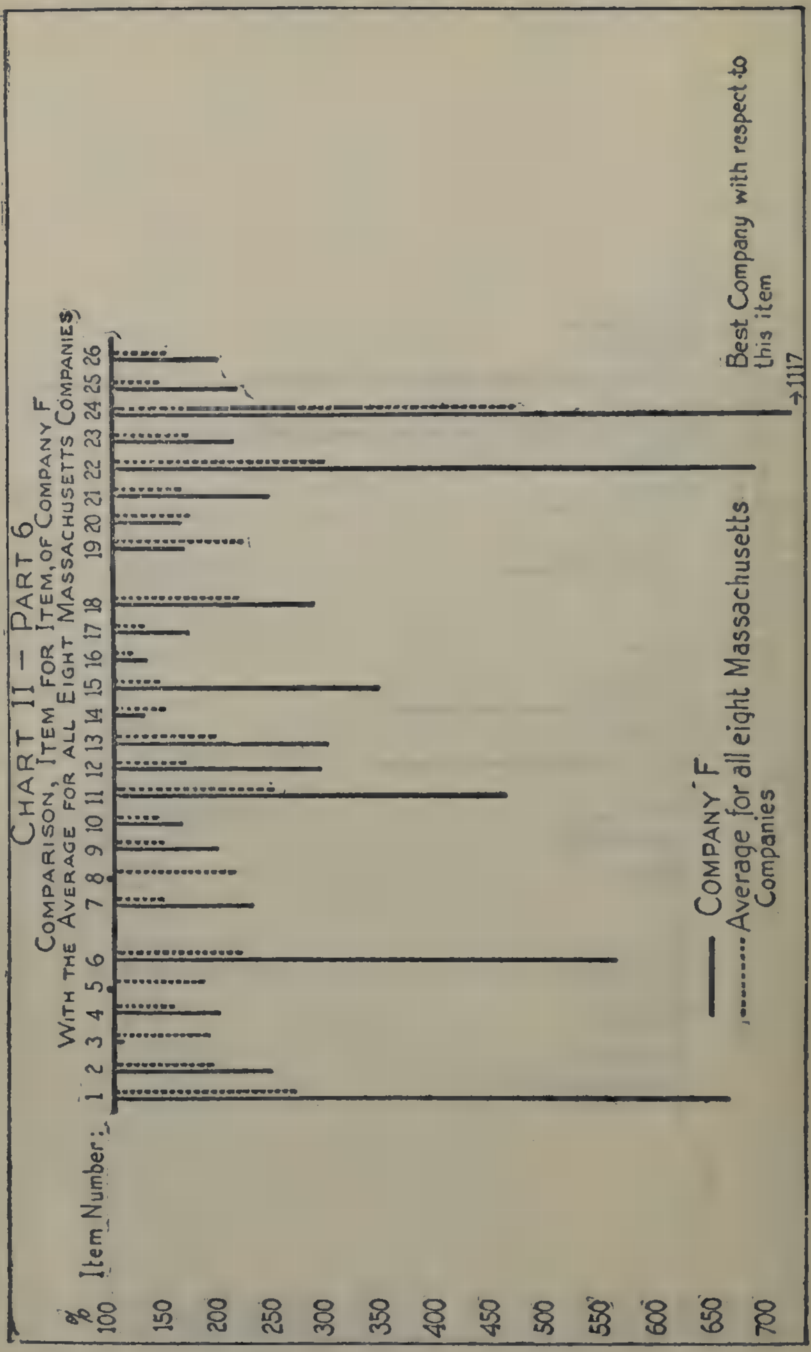


CHART II – PART 6
COMPARISON, ITEM FOR ITEM, OF COMPANY F
WITH THE AVERAGE FOR ALL EIGHT MASSACHUSETTS COMPANIES

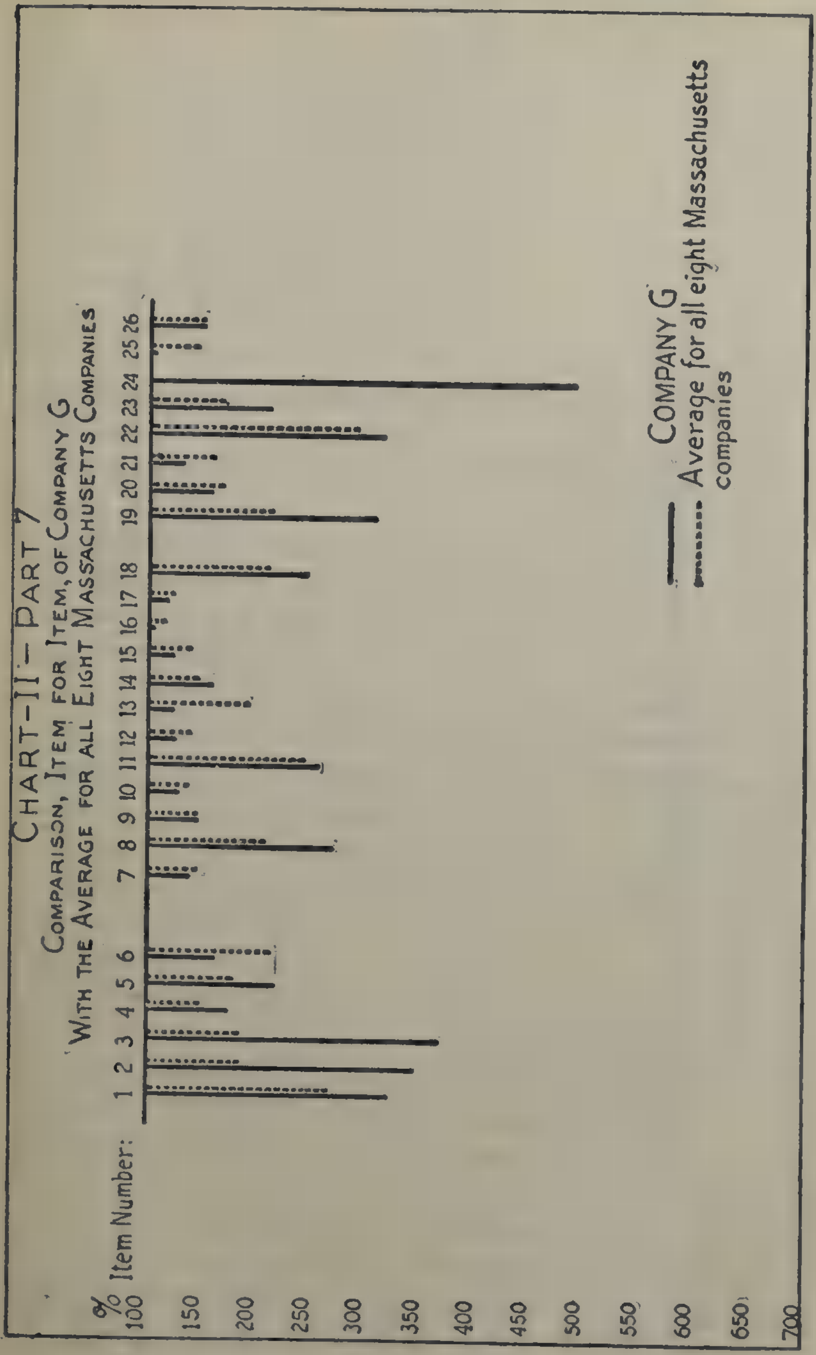


CHART-II - PART 7

COMPARISON, ITEM FOR ITEM, OF COMPANY G WITH THE AVERAGE FOR ALL EIGHT MASSACHUSETTS COMPANIES

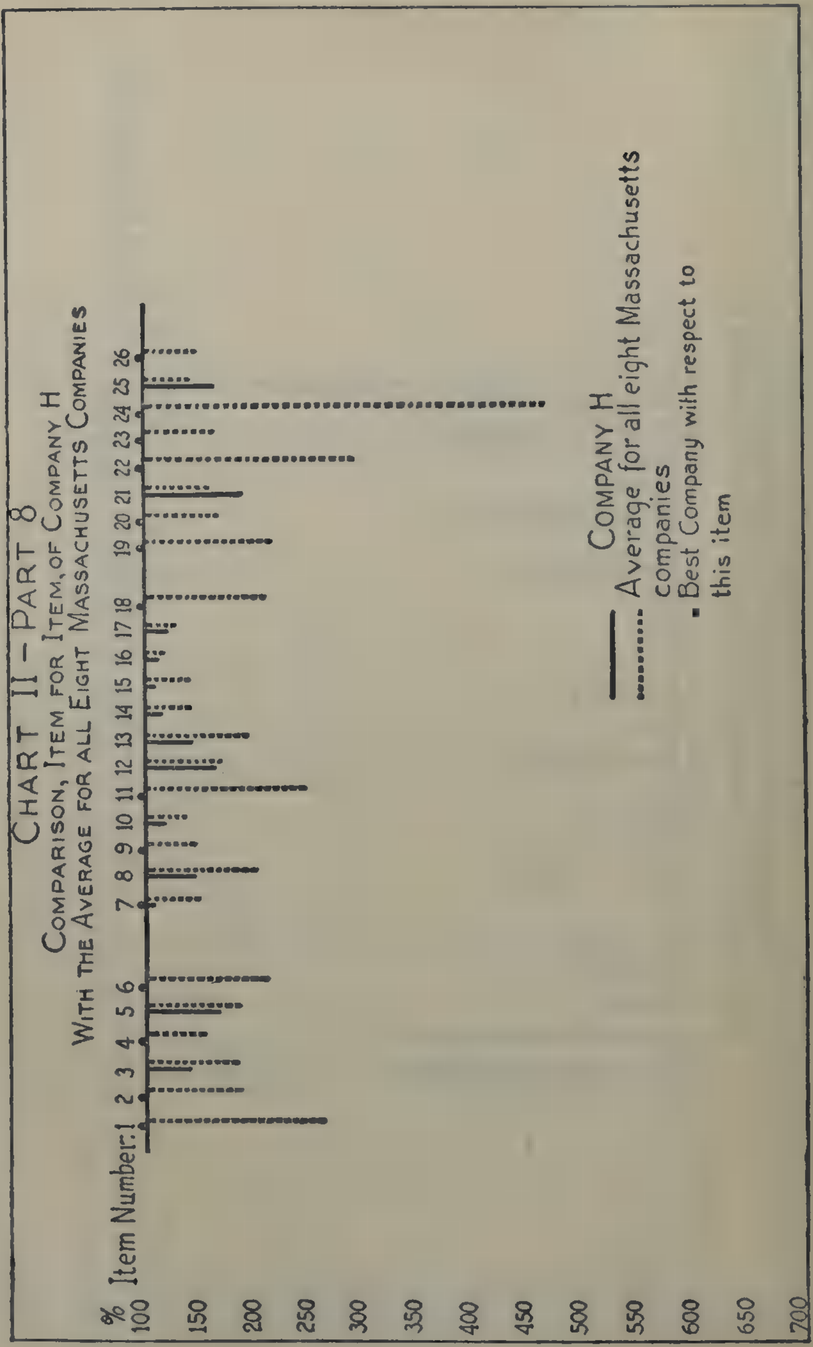


CHART II – PART 8

COMPARISON, ITEM FOR ITEM, OF COMPANY H WITH THE AVERAGE FOR ALL EIGHT MASSACHUSETTS COMPANIES

(c) companies which are inefficient in one particular, as engineering, tend also to be inefficient in other particulars, and *vice versa.* Thus company H is the most efficient in a little more than fifty per cent of the cases, while company F is credited with the best showing in respect to only items numbered 5 and 8. In (c) is given a more general statement of a law that was suggested by statement (2) above.

These are the more important conclusions which a careful study of the material has suggested. In and of themselves these statistics, while indicating a variation in efficiency from company to company, do not conclusively demonstrate the proposition that there is an accumulation of inefficient or relatively inefficient plants greater than would characterize a competitive industry. Obviously no such conclusion could be drawn from so limited a number of cases. But, on the assumption that the cases studied are typical, and they should be so considered, the conclusions tentatively drawn from them can be extended to the generality of companies and be said to picture the general situation at the present time. This fact, taken together with the fact already emphasized, that there is no force which would compel the relatively inefficient company to rise to a higher level of efficiency in order to survive, affords further demonstration of our general proposition with respect to the distribution of efficiency among utility undertakings.

Two further considerations may also be mentioned. The analysis of the efficiency of eight Massachusetts companies may be said to have resulted in an understatement of the general situation in this country, for the reason that Massachusetts utilities generally are older and more conservatively and carefully managed than those in other parts of the country, and tend to grow more to type, as do the cities which they serve. It is also to be borne in mind that electric utilities are generally better and more uniformly developed than most other classes of utility.

TABLE XIV. RELATIVE RANKINGS OF THE EIGHT MASSACHUSETTS ELECTRIC UTILITIES

Company	Group I (items 1–6)			Group II (items 7–18)			Group III (items 19–26)			Total of all Preceding	Final Rank
	Rankings	Total	Rank	Rankings	Total	Rank	Rankings	Total	Rank		
H	1, 1, 3, 1, 4, 1	11	(1)	1, 2, 1, 2, 1, 4, 4, 2, 4, 4, 3, 1	29	(2)	1, 1, 7, 1, 1, 1, 7, 1	20	(1)	60	1
A	2, 2, 4, 2, 3, 2	15	(2)	5, 6, 4, 5, 6, 2, 5, 8, 1, 3, 2, 4	51	(4)	5, 2, 2, 5, 4, 3, 1, 6	28	(3)	94	2
B	6, 4, 7, 3, 6, 6	32	(5)	3, 8, 3, 4, 2, 5, 2, 3, 3, 5, 6, 3	47	(3)	4, 3, 4, 3, 3, 2, 4, 3	26	(2)	105	4
C	5, 5, 6, 5, 5, 4	30	(4)	2, 4, 2, 1, 3, 6, 1, 1, 2, 2, 1, 2	27	(1)	6, 8, 5, 2, 8, 5, 5, [illegible]	41	(6)	98	3
D	3, 3, 5, 4, 8, 7	30	(4)	6, 5, 6, 6, 4, 7, 6, 5, 5, 7, 7, 5	69	(6)	8, 7, 1, 3, 5, 4, 6, 4	38	(4)	137	7
E	4, 6, 1, 7, 2, 5	25	(3)	7, 3, 7, 7, 7, 3, 8, 7, 7, 1, 5, 7	69	(6)	2, 4, 6, 7, 2, 7, 3, 8	39	(5)	133	5
F	8, 7, 2, 8, 1, 8	34	(6)	8, 1, 8, 8, 8, 8, 7, 4, 8, 6, 8, 8	82	(7)	3, 6, 8, 8, 6, 8, 8, 7	54	(7)	170	[illegible]
G	7, 8, 8, 6, 7, 3	39	(7)	4, 7, 5, 3, 5, 3, 3, 6, 6, 2, 4, 6	54	(5)	7, 5, 3, 6, 7, 6, 2, 5	41	(6)	134	6

These two considerations outweigh in large measure the fact that a limited number of companies were used. The second point is that an historical presentation of the material here given would add greatly to the conclusiveness and significance of the results which have been obtained. Tendencies could be detected and causes could be discovered with more accuracy than they can at present. Limitations of material and time preclude the making of such a study at the present time.

Other Forms of Evidence

Before passing to an analysis in the next chapter of the causes which explain these differences in efficiencies it will be well to examine briefly another kind of evidence. This evidence partakes somewhat of the historical character just referred to but does not admit of ready statistical presentation.

The physical scientist, in order to study any cause and effect relation, isolates so far as possible the conditions which he wishes to observe and by repetition detects the effects which a change in one set of conditions, the causal, produces in the other set of conditions, the effects. In this way he establishes relationships and possibly a definite law of physics or chemistry. It has long been a commonplace among students of the economic sciences that this method of analysis is an exceedingly difficult one and one that can rarely be used, both because of the character of the material and because the conditions are entirely beyond the control of the observer. The casual turn of events must provide the material for such analysis. It is to some such material as this that attention is now directed.

Before the war there was a gradual, but during and for some time after the war there was a sharp and extended rise of the price level and an unwonted scarcity of labor and materials. Public utilities, more than any other single industry, felt the effect of this unexpected turn of events.

Other aspects of this matter will be dealt with later; for present purposes it is sufficient to note that herein was presented that change in conditions to which reference has been made. A modestly prosperous industry suddenly found itself in a desperate condition. Attention to "little matters," to the saving of material or the cultivation of a good feeling among the employees, displaced a more or less widespread disregard of such matters, as an idling son, suddenly disinherited, begins to see some significance in matters which previously had not seemed to warrant attention. This was true of every kind of utility, although the central station industry probably felt the effect of this force much less than did other kinds of utility. Thus President Vail, of the American Telephone and Telegraph Company, who may be said to speak for the American telephone industry, is reported as having said in a letter to the stockholders of the company late in 1919:

> Increased operating charges would be largely met by getting better service from the same or even less exertion of personal efforts, aided and supplemented by mechanical appliances and by the revenues from increased services of unused facilities and from additional services over the same plant.[1]

In other words, attention was given to smaller economies and research was stimulated to improve operating efficiencies. If, then, such improvements were made *after* conditions had called them forth, why could they not have been made before this last sharp rise of prices? Granting that some of these improvements could not have been made profitably before, the fact remains that a very considerable portion of them were not made simply because the effort required to make them was not put forth. If efficiency can be expressed as the relationship between the attainable and the attained there is evidence here of preëxisting inefficiency in some degree.

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[1] Report of Committee on Public Service Securities, *Bulletin of Investment Bankers' Association.* vol. VIII, no. 6, December 3, 1919, p. 109.

From the same source is obtained this quotation showing exactly the same situation in the gas business:

> These conditions (chiefly increased costs and fixed incomes), precipitated by the war, led to economies in the manufacture of gas and to the exploitation of its by-products, and these effected substantial offsets to the increased costs of production.[1]

Still more striking, perhaps, is the situation in the electric railway industry. Because labor expense constitutes so large a percentage of the total operating expenses of electric railways and because of public dislike for an increased rate of fare, their problems were particularly acute. So far as possible, then, operating economies were resorted to to save the day for the industry. A statistician employed by one of the large utility engineering firms disclosed this situation very clearly in a study prepared for use before the Federal Electric Railways Commission, which was then in session.[2] The writer's first point was that the "pre-war increase in costs of labor and material has been offset by improvements in efficiency, but that the increase due to the war came too quickly to be so absorbed." These figures are cited:

OPERATING EXPENSES PER FIVE CENTS OF REVENUE

Year	Amount (cents)	Increase over 1902 (cents)
1902	2.87	..
1907	3.00	0.13
1912	2.94	0.07
1917	3.19	0.32
1918	3.61	0.74

From 1902 to 1915 labor cost increased about two per cent per year and material cost about one per cent per year, or an average of one and one half per cent per year. Mr. Emery then continues:

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[1] Report of Committee on Public Service Securities, *Bulletin of Investment Bankers' Association*, vol. VIII, no. 6, December 3, 1919, p. 111.

[2] Emery, J. A., "Statistics show Railways' Plight," *Electric Railway Journal*, August 23, 1919, pp. 394–96.

> Electric railway managers were able to counteract such increase in prices by continuous improvements in efficiency so that in 1912 the cost for 5 cents of revenue was only 2 per cent greater than in 1902, indicating an increase in efficiency of about 13 per cent in the ten-year period. . . .
>
> Since 1915 operating expenses for 5 cents of revenue have increased by about 21 per cent or 7 per cent per year, a rate which is altogether beyond the efforts of managers and engineers to cope with.[1]

Again the question may be asked, To what extent may the failure to introduce economies and to operate with every possible degree of efficiency be charged to laxness and inattention on the part of the management? Conclusions on this subject are exceedingly difficult to draw, since there are many pertinent considerations which space does not permit our bringing into this discussion. But the general method of proof here adduced cannot fail to disclose some failure, it cannot be said how much, to make the best possible use of available opportunities. Why this should be so will be pointed out in the chapter which follows.[2]

Further broader evidences of large mistakes, mistakes which seemingly could have been avoided if all the known factors in the situation had been carefully considered and if the unknown ones had been resolved with imagination and a high degree of common sense, can also be cited in this connection. And whereas in competitive industry the individual establishment must bear the burden of making mistakes (for if the cost of mistakes could be passed on to the consumer a condition would exist in which all "the traffic would bear" would already have been exacted), in the case of public utilities the public tends, in the long run, to bear the burden through diminished service or high rates or through the postponement of improvements which would otherwise be available. Thus not more than two or three years ago the water-gas industry was in danger of being choked through the enormous rise in the price and the scarcity of oil. This condition has now passed, at least temporarily, but other changes in the process of gas manufacture, which would mean much less costly production, must wait upon the amortization of the investment in existing plants.[1] Likewise many electric railways, especially the interurbans, find it difficult to cope with unexpected automobile competition. But such competition might well have been anticipated. Certainly much of the existing investment in such properties would not be made again at this time. The statement of H. L. Doherty, a large figure in the American utility field, made in an address before the American Gas Association in 1919, that "I do not feel that we have even availed ourselves of the discoveries made by others in physics, chemistry, and economics,"[2] expresses the point here made.

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[1] Emery, J. A., "Statistics show Railways' Plight," *Electric Railway Journal*, August 23, 1919, p. 394.

[2] *Moody's Analyses of Investments, Public Utilities and Industrials*, 1918, p. 6, mentions the overcapitalization of New England companies and the failure of growth of population and wealth to absorb all of this [illegible] it has done in the newer parts of the country. As a result of this situation "in New England, we find that among permanently successful companies there has been developed more efficiency of operation as a whole in the past ten years than has been the case in some other parts of the United States." That the same force has been at work in the case of the railroads is shown in the many economies which have been resorted to as a protection against utter ruin.

Finally, there is the evidence which comes from those public officials who are in a position to judge of the efficiency

[1] It should not be presumed, of course, that the tendency is to be to eliminate the water-gas plant entirely; in fact, despite the conditions noted there was added investment in such plants during the period noted, the relative ease of installation and greater availability being factors entering in here. But companies with water-gas installations, being limited in their return and being more or less protected in their investment, will persistently use a more rather than a less costly process if the latter involves the replacement of existing facilities.

[2] *Gas Age*, November 15, 1919, p. 441.

of individual companies through coming into direct contact with them. The state commissioners have an exceptional opportunity to compare the efficiencies of many companies. Full consideration of this matter is postponed until a later chapter is reached, but that the state commissions in their numerous decisions frequently criticize the results achieved by certain companies and recommend means of raising their efficiency affords unmistakable proof of the inefficient conditions which exist in the case of many companies. The following statement by Chairman J. W. McArdle of the Indiana Public Service Commission, in a recent address before the American Electric Railway Association, is not uncommon and no doubt is representative of the views of many other commissioners:

> As a public service commissioner I have run into too many cases of mismanagement and inefficiency in the field of the municipally owned and operated utility to believe that public ownership is any guarantee of good service at reasonable rates. On the contrary, we are generally surprised to find a publicly owned utility that is also well operated.
>
> We find altogether too much inferior operation and management among the privately owned utilities, yet the cases of intolerable operation and management are comparatively few.[1]

Again, the several city street railroad commissioners whose duty it is to see to the enforcement of the service-at-cost franchises described at length in a later chapter, often have occasion to point out inefficient practices. Concrete examples are found in the annual report of the directors of street railroads of the cities of Cleveland and Cincinnati, Ohio, for the year 1920. A saving of over four million dollars in power cost alone as the result of the scrapping of an inefficient generating plant, "disregarding altogether the saving in copper cables, the gain in the transmission of power short distances and the increased operating efficiency of the cars through high voltage," is referred to in the Cleveland report. In the Cincinnati report numerous ways of increasing the efficiency of the street railway system are suggested by the commissioner. These include the installation of up-to-date generating equipment, the use of current meters, the institution of a schedule department which has saved the company "approximately $500 a day in platform time with an actual improvement in service," multiple berthing, the elimination of the double trolley and the installation of modern equipment in place of antiquated types. It is easy to suggest improvements and another thing to secure the funds for making them available once their practicability is assured; but there can be no mistaking the significance of the evidence here cited. It can mean only that a large percentage of utility companies are inefficient when account is taken of their opportunities. Why such a situation as this should so generally obtain is pointed out in the following chapter.

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[1] *Aera,* March, 1922, p. 682.

CHAPTER III

EFFICIENCY IN PUBLIC UTILITIES (*continued*) — FACTORS WHICH EXPLAIN THE EXISTING SITUATION

In the preceding chapter there was presented a body of evidence which, taken in its entirety, leaves no doubt [redacted] to the existence of large differences in the efficiency with which various utility enterprises are conducted and of a disproportionately large number of inefficient undertakings. Our present task is to explain this situation.

Causes — Permanent and Temporary

The forces or causes which have produced this situation may be characterized as being of two kinds, permanent and temporary. The latter might, perhaps, better be termed recent manifestations of deeper lying causes. The former set of causes may be split up into four groups, *viz.*, those causes relating to the inherent nature of public utilities, those relating to the regulation to which they are subject, those relating to differences in opportunities, and those relating to the differences in the capacities of individuals. Each will be analyzed in turn.

The Inherent Nature of Public Utilities

The most fundamental and distinctive of these causes are in the first group, when taken in connection with their counterparts in the second group./It is a commonplace of economic analysis to say that public utilities are "natural monopolies" and no argument at this late date is needed to sustain this general view. Interest will still attach, however, to a careful examination of the evidence to determine more precisely the extent to which this statement really is true. Oftentimes the truth is partially concealed through the use of terms whose definite connotations make it difficult to realize that they express, not an absolute, but a relative truth. To what extent, then, are public utilities really monopolies and to what extent does competition enter into and affect their well-being and existence?

First of all, it should be observed that it is impossible to establish a definite line of demarcation between competitive and non-competitive industries. The earmark of monopoly is control of supply or of demand or of both. Control rests on a shifting foundation which the interplay of personalities, of public opinion, of law, of scientific discoveries and economic forces lays down anew from time to time. The test of monopoly power is said to be the ability to control price. By such a test some nominally competitive industries would necessarily have to be considered monopolies, for in some of them the individual producer faces a situation in which price has all the appearance of being immutably fixed, and in which exertion on his part avails little in modifying it. The truth of this somewhat obvious statement is seen in the fact that there is an active federal agency engaged in preserving, i.e., nurturing, competition.

To what Extent are Public Utilities Competitive?

If monopoly is ever present in competitive industries, to what extent is competition ever present in monopolistic industries? Competition here takes on several aspects:

(1) There are, first of all, cases in which a public utility has as a competitor another public utility of like kind. Thus in Washington, D.C., there are two entirely distinct electric railways whose lines in certain parts of the city parallel one another and which compete in the development of suburban traffic. A like situation exists in many localities with respect to electric and telephone companies and other public utilities. But of course conditions in this

respect are vastly different from what they were a few years ago, and where there is competition it tends, as always, to be self-eliminating. Where competition still exists it is no doubt of some practical importance, but because cases of this sort are relatively few in number and are self-eliminating no further attention need be paid to them.[1]

(2) A second form of competition is that which may exist where there are a private and a public plant of the same kind serving the same community. Thus the city of San Francisco recently laid down tracks on Market Street, the strategic street of the city, which parallel those of the company which serves the greater part of the city.[2] It should be noted that in many instances the city operates a plant to supply only the public lighting, as in Detroit and Chicago. But nevertheless competition is imminent, since the city may at any time enter upon a policy of supplying private consumers, as has been the case in Cleveland. In other cases cities have provided emergency forms of transportation as a means of bringing a recalcitrant private utility to terms when the granting of a new franchise or the passage of a new regulating ordinance was pending. Nowadays this particular method of coercion takes the form, usually, of the city's invoking bus competition with electric railways. Toledo, Ohio, Bridgeport, Conn., New York City, and Des Moines, Iowa, among others, have recently had experiences of this sort. Competition of this kind, whether sincere or not, is not wholesome; it indicates a strained relationship between the city and the private utility serving it. More amicable means should be found of aligning properly the common interests of city and company. While costly to both, this form of compe-

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[1] See later discussion of effect of commission regulation on competition. For extensive list of consolidations in a typical state, see *Biennial Report of Wisconsin Railroad Commission*, 1918–19, pp. 15–18.

[2] *National Municipal Review*, November, 1919, p. 608.

tition usually results in favor of the company, for such methods of coercion are necessarily weak. To be sure, instances of this latter kind are relatively rare.

(3) The third and most potent form of competition in the utility field is the competition of unlike sources of supply for the same business. Thus the private automobile competes with the electric railway and the gas with the electric business as to both lighting and heating. It is this kind of competition which persons not intimately acquainted with the utility business are most likely to overlook. Every kind of utility feels the effects of it, although some feel them more than others. The American gas industry furnishes a clear-cut illustration of the kind of competition mentioned. Reference here is to something more important than the attempt of the gas industry to regain some of the lighting business which electricity took from it some years ago. Gas is essentially a fuel and must compete with all substitute forms of fuel. It is automatically cut off from many forms of consumption if either increased production costs necessitate a higher rate schedule or the prices of other fuels, as coal and kerosene, fall low. This is an especially dangerous form of competition where the competing source of supply is not a public utility and may conduct its business outside of the restraints of regulation. The gas industry is seeking to find ways of meeting just such a situation at the present time. The development of the recovery of by-products seems to offer the best way out, but, unfortunately, this waits upon the happy conjuncture of a number of conditions — a ready market for the by-products and an easy condition of the investment market, among others — some of which are lacking at the present time.[1]

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[1] For one of many similar articles bearing on this subject see Alwyn-Schmidt, L. W., "Reduction in Price of Gas to the Consumer a Way to Prosperity in the Gas Industry," *American Gas Engineering Journal*, November 1, 1919, pp. 417–19.

The conclusion is, then, that while these three types of competition are important and by no means negligible, they yet are not of that vital, destroying, fear-provoking character which is commonly associated with the so-called "competitive industries." Any advantage which one utility, private or public, or any other source of supply can obtain over another utility or source of supply will not be so suddenly realized and of such an all-important character as to threaten totally to destroy the latter's business. It can usually be foreseen and anticipated and rarely indeed will it take away more than a relatively small portion of its total business. This is not so true of other industries, for while good will and an established custom and much advertising may retain a company's customers long after their economic interests would be furthered by going to a rival producer, the danger of complete elimination from the competitive field is both imminent and real and must always be counted upon as a possibility.[1] A further count in this connection is the fact that the gross business of public utilities tends to increase of its own force with the growth of population and the general rise of the standard of living. A considerable loss of business to a competitor can therefore be suffered without any apparent change in the situation at all.

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[1] "A Massachusetts shoe manufacturer in the course of one of those questionnaires with which Washington officialdom likes to harass business men was asked the length of life of his machinery. He has apparently made a practical instead of a theoretical charge for depreciation. His reply throws light on that whole subject. 'I know that if a new machine is invented next year better than mine, mine will be dead. It will be junk, worth only what the metal in it is worth. Its life depends on the date of the next invention. I wish you would tell me that date. I have tried to learn it. When I do I can answer your question. I am in a competitive business and must be prepared to adopt the best and latest machine as soon as it appears.'" (Warren, B. W., "Depreciation, with Special Reference to Service-at-Cost Agreements," *Electric Railway Journal*, January 10, 1920, p. 89.)

The Telephone Industry

The reader may wonder whether what has been said is true of at least two of the utility fields, the telephone and the electric railway utilities. The answer is both yes and no. Each is subject to forces which may prove disastrous at any time. The telephone industry, while not exactly a new industry, is yet one which is unstable because its technique is relatively undeveloped. It may some day find some form of wireless communication looming up as a competitor with a resulting destruction of a large part of the fixed investment tied up in the existing systems. Being a highly centralized industry in this country its research also is largely centralized so that new developments will not likely be foisted upon it from the outside but rather will be of its own achieving. It may be that in this way development is actually retarded. In any event the industry is as well prepared as it can be to absorb the shocks and losses which progress entails. And the probability of a total destruction of existing telephone traffic is very remote indeed.

The Electric Railway

A somewhat more difficult situation is presented by the electric railway industry. Here there already is something more nearly akin to a dangerous rival in the form of automobile competition. It is not the purpose here to do any more than describe the issues briefly. The use of the automobile has spread so remarkably in the past few years that it has entirely changed the appearance and planning of our cities. There are various estimates of the number of automobiles in use. Statistics compiled by the United States Bureau of Public Roads, quoted in "Facts and Figures of the Automobile Industry," 1922, published by the National Automobile Chamber of Commerce, indicate that there were 10,448,632 registrations of automobiles in 1921 as compared with 7,558,848 in 1919 and 3,512,996 in 1916. In 1914 there were approximately 2,500,000 registrations. In any event there has been a truly remarkable spread of the use of this means of conveyance. The automobile competes with the electric railway in three ways: as a domestic vehicle, ridden by owner,[1] as a commercial passenger vehicle, the "bus," "jitney," or "trackless railways," and as a commercial express vehicle, threatening especially the interurban freight business. It is too early to predict the outcome of this rivalry between electrically and gasoline driven, between track and trackless means of transportation, although protagonists are at hand with cost data to prove the relative advantages of the two methods.[2] It is a fact that the figure for per capita street car rides has increased in the last decade, indicating in itself that there has been no absolute decline in electric railway traffic.[3]

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[1] A special Massachusetts legislative committee has estimated that private automobiles, exclusive of "jitneys," have reduced the income of the traction lines of the state twelve per cent and that if this figure is applied to the whole country in proportion to the population the loss in revenue suffered by electric railways would amount to about $70,000,000 a year. (*Electrical Review,* December 16, 1919, 938.) This figure is probably far too low.

[2] See Jackson, W., "The Place of the Bus," *Electric Railway Journal,* February 28, April 3, April 21, May 29, July 3, July 31, 1920; Thirlwall, J. C., "The Urban Transportation Field Analyzed," *Electric Railway Journal,* October 1, 1921.

[3] There have been many intimations of late that the electric railway industry is becoming extinct. The Federal Electric Railways Commission gave especial attention to this question and concluded as follows:

"While there is some diversity of opinion as to the permanency of the electric railway industry, in view of the improvements which are being made in the use of gasoline and electric power machines, the opinion appears to be nearly unanimous that the electric railway operating on tracks is the most efficient means of furnishing local transportation service in the urban centers. The future of the gasoline public conveyance in urban transportation is entirely unreckonable. . . ." (Complete text in *Aera,* September, 1920, pp. 154–84.)

For a particularly able discussion of this matter see Tripp, G. E., "Are Street Railways a Real Public Utility," *Aera,* December, 1919, pp. 563–72. It is interesting to note the efforts made by the electric railway industry

Competition a "Recessive" Factor

The conclusion reached, then, on the basis of this whole discussion, is that in the case of most of the local utilities competition, while an important factor, is not of such a character as entirely to jeopardize the life of a utility undertaking. It makes it important to watch one's own sales and those of one's competitor, but it does not cause that restless searching for new sources of profit and economies which characterizes competitive industry. The market for one's services is, in other words, fairly well assured and cannot suddenly be taken away.[1] That this is less true of the telephone and electric railway industries is counterbalanced in the one case by ample preparation and by a

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to stifle so-called "jitney" competition. Attempts have been made, and in some jurisdictions, as Massachusetts, they have been successful, to declare jitney competition unlawful except under certain specified conditions. In other places high licenses and other requirements have been imposed. There is much to be said in favor of limiting such competition, for it is piratical to a large extent and takes away the most profitable business of the utilities. A very interesting problem of economics and law is here involved. A sane view would seem to be to restrict jitney service to portions of communities not otherwise adequately served. See Re Ashmead, in which the New York Public Service Commission, Second District, established such a precedent. (*Public Utilities Reports Annotated* (hereinafter cited as P.U.R.), 1916 D, 10.) The prediction is ventured that eventually the electric railway and the automobile will be combined into a mutually complementary system whereby the proper sphere of each will be recognized and their respective advantages utilized to the greatest good of all concerned. Something of this kind has happened in England.

[1] This is well expressed by the Wisconsin Railroad Commission in Hill *et al. v.* Antigo Water Co., 3 W.R.C. Reports, 1909, pp. 623, 720–21:

"When public utilities earn more than reasonable returns on their investment, it is quite likely that this extra earning can be traced to their monopoly advantages. Their bargaining powers are greater than those of their customers. Their customers are limited in freedom of choice. They have fitted up their homes with pipes and fixtures and these are connected with the mains of the local utility. These pipes and connections have also, as a rule, been put in at their own expense. They have no option of patronizing a competing company in case they become dissatisfied. Even if there were another utility of the same kind in their place, the change would be so costly that it would likely result in a loss in the long run."

degree of control of new ideas, in the other by a natural increase of business with the normal growth of cities which always promises an absolute, if not a relative, increase in the business done. This much is realized by the electric railway industry and new investments will be made with it in mind.

The Effects of Monopoly and Isolation

Competition in the public utility field is therefore a relatively "recessive" factor. Monopoly in this field as in all others is contingent upon a number of circumstances and is not so absolute as one might infer that it is. It is better, then, to think of the public utilities of this country as constituting a large number of somewhat isolated and relatively non-competitive units, each serving a given population area and furnishing a service which is rarely compared and in fact can scarcely be compared directly with the service which other utilities are furnishing other communities. The bearing which the syndication of the control of utilities has upon this statement will be examined presently. If the conclusions reached are sound, all of the effects which monopoly produces in addition to those produced by isolation may well be expected. By no means should the fact be discounted that even monopolies are constantly seeking additional sources of gain. Their desire to obtain the maximum profits is tempered only by the fear of potential competition and the apathy which relative security of position produces. The fear of losing what one already has is a greater stimulus to action than the hope of adding to that which one already has.[1] If relative security characterizes the public utility business, then there will be less of that restlessness, of that seeking for all sources of gain, however small, of that preparedness for all possible emergencies which characterize competitive businesses.[1] To the effects thus attributed to the monopolistic feature of the public utility business must be added those of isolation. Certain tendencies which are overcoming this isolation will be examined later; for present purposes it is sufficient to state that isolation of a utility, as well as isolation of an individual, results in an inbreeding of ideas and a conservatism which are hostile to the attainment of the maximum degree of productive efficiency. The problem becomes, then, to a large extent, one of reconciling the evil and good features of a condition, of obtaining the advantages of monopoly while retaining the advantages which competition is generally considered to produce.

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[1] The conventional marginal utility analysis amply proves this. It may also be mentioned in this connection that monopolistic industries always tend to be industries having heavy fixed charges. Where this is not the case it is because the monopoly is based on some privilege or legal provision which keeps ordinary economic forces from working their full influence. In any industry in which the fixed charges are high there is special fear of loss and consequently a greater effort is made always

The Effects of Regulation

Since regulation of one kind or another is a necessary concomitant of monopoly, we naturally pass from a discussion of the monopolistic character of public utilities to

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to provide a proper margin of safety between expenses and revenues. Where this is the case there undoubtedly is a tendency here which offsets to some extent the effects above noted. To apply this reasoning to public utilities, it can be said that especially those public utilities which are relatively unprofitable will try to preserve their investment by paying the closest possible attention to all possible sources of saving. A prosperous and secure monopoly would feel such promptings much less than one that is not prosperous and secure.

[1] The Public Service Commission of Massachusetts has spoken on this subject as follows:

"Realizing that it is exposed to certain dangers, we do not find the arguments commonly urged against public operation entirely convincing. Doubtless illustrations of inefficiency are not hard to find but certainly it is no more difficult to find similar instances in the case of private management, as New England well knows from bitter experience. Under the spur of competition, private initiative probably develops maximum efficiency, but there is little evidence that this is true in the case of natural monopolies." (*Sixth Annual Report of the Massachusetts Public Service Commission*, 1918, part I, p. xxxi.)

a consideration of the effects which public regulation of them has produced.

Recent Developments in Regulation

Public utility literature is abundantly supplied with discussions of the purposes and accomplishments of regulation.[1] There seems, however, to be less unanimity as to either of these matters at the present time than there was some years ago; preconceived notions of what regulation was destined to accomplish have in many particulars not been realized in practice. Regulation is still in a state of flux. It has seemingly taken on an entirely new aspect of late, perhaps an aspect which seems altogether unexpected and unwarranted to those who were its early protagonists. Originally a "people's" or a "consumers'" movement, to-day regulation has become by force of circumstance the champion of the rights of the utilities. That this should be the case is readily explainable in terms of economic developments over which no one has been able to exercise undue control. An unusually rapid and prolonged rise in the price level in the last four or five years, coupled with the relatively fixed incomes of the utilities, has placed the emphasis in commissions' activities, not on the reduction of rates to reduce excessive profits or to eliminate discrimination, but on the increasing of rates or the procuring in other ways of the revenue needed by the utilities, by subsidies from the public tax rolls, if necessary, in order that they might keep from floundering and from thereby depriving the people of good service, or, in fact, of any service at all.

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[1] It should be noted that in the present treatise the emphasis is placed on state regulation as distinguished from local regulation. The latter is brought in as occasion demands, as in the discussion of service-at-cost in an ensuing chapter, but in general it is felt that local regulation is altogether too uncertain an element to permit of careful analysis. If it be regulation at all — for does not regulation imply the action of an outside agency and not that of an agency which is itself a party in interest? — it is of secondary importance, first, because it has given way and is giving way to a more orderly form of control, and, second, because its very variability renders it too elusive to analyze. Speaking before the Federal Electric Railways Commission of the recommendations of the National War Labor Board that fare increases be granted in view of wage increases allowed by the Board, Joint Chairman Wm. H. Taft said: "I am bound to state that that recommendation with state authorities not infrequently had weight. But when it came to local councils, or to referendum, it might just as well have been written in water." (Quoted in *Aera*, July, 1919, p. 1157.) This is an illustration of the difference between state and local regulation here had in mind. Such a body as the Board of Supervising Engineers, Chicago Traction, which is made up of representatives of both interests, has done much valuable constructive work. There is no wish to disparage such efforts as this and other able boards in a few other cities have put forth. It may also be mentioned that the cities having service-at-cost franchises commonly have some form of continuous regulation which may well be the source of many helpful developments in utility regulation.

There has been much interesting "backfire" from this change in the character of the tasks falling upon the commissions. This has principally taken the form of attacks upon commission regulation and of increasing emphasis on the merits of home rule. In some states, including Illinois, Missouri, and Indiana among many others, determined efforts have been made to eliminate commission regulation entirely; in others, attacks have been made on the ability or fidelity of the commission or steps have been taken to secure legislation which would emasculate the commission's basic law. The utilities have rallied to the support of the commissions and through the press and in other ways have extolled the merits of commission regulation and enabled it somewhat to withstand the shock of public criticism.

So much has been said of the existing situation in order to afford a background against which to place in perspective certain of the features of commission regulation which are next to be considered.

We are interested in commission regulation solely as it bears on the question of the efficiency with which the public utility business of the country is carried on. There are analyzed at this point some of the more general aspects of this matter, certain of the general effects of commission regulation being described first, and then its more direct bearing on efficiency. At a later point there will appear the more detailed discussion of the ways in which regulation can be made to function most fully as a means of energizing progressiveness in utility management. The aspects of regulation now under review will be considered under the respective heads of regulation and speculative management, regulation and politics, regulation and service, regulation and utility financing, regulation and operating conditions, and regulation and initiative.

Regulation and Speculative Management

By the speculative element is meant that fortuitous combination of chance, foresight, craftiness, and skill which produces a financial result different from that which normally would be expected. It shows itself in the profit and loss account and perhaps as often on the one side of that account as the other. It represents instability of forces. While it is too much to say that regulation has done away altogether with the speculative element in the public utility business, it is true that regulation has greatly diminished the force with which this factor plays on the situation. In effecting this result commission regulation has no doubt accomplished its most striking, albeit not its most important, work. It has tended also to take away what might be termed the "differential advantages" of location and skill. This result is seen in its limitation of the rate of return to what is considered a fair return on a fair value of the property used and useful for the service of the public.[1] In a rapidly accumulated number of rate cases a limitation of return has resulted, in this respect, in the complete elimination of the strictly profit element in the utility field. What the results of this situation are will be seen later; for present purposes it is sufficient to say that regulation, through partially destroying the speculative element, has destroyed the possibility of exceptional reward for exceptional effort. The reward not being possible the effort is not put forth. Hence results a tendency to reduce utility operation to a dead level of sameness and mediocrity and the driving of bold and more energetic spirits to other lines of endeavor. As a counter consideration the fact should be noted that a non-speculative outlook in the management of public utilities, and indeed of any business, tends to place the emphasis on permanently valuable things. Thus in England the management of public utilities is more a matter of good technique than of financial adventure; something of the same effect may be said to have been produced on American utility financing as the result of a number of years of public regulation of the utility business. We shall revert to this argument later.

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[1] It is true, of course, historically, that this doctrine was originally established by the courts, but the commissions have adopted it and have been the chief administrative agency for putting it into effect.

In turn the companies have been more or less protected in the management of their business, although in no case has the limitation of the return to a designated amount carried with it a guarantee that that return shall be assured the company, if not from earnings, then from other sources.[1] Competition has been restricted in a variety of ways: through the familiar requirement that a certificate of public convenience and necessity be secured from the commission before the construction of a new plant and system be undertaken, through control of extensions of existing systems, through the indeterminate franchise, and in general through a control of rates which in most states where commissions are really effective would make unprofitable rate wars impossible. These have all been steps in the right direction, but every one of them calls for the exercise of a restraining wisdom, impartiality and good judgment on the part of the commission which, if lacking, can result very disastrously to either the utility or the public.

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[1] See later discussion of service-at-cost. A return is guaranteed under a Massachusetts law noted later. See also Transportation Act of 1920, sec. 15a, where a return which, once normal conditions are reached, is, for all practical purposes, guaranteed, is instituted.

It may be said in this connection that commission regulation, instead of furnishing protection to the companies, has jeopardized their financial condition and their very existence. This argument is more familiar to the economist as applied to the regulation of the railroads. It is no doubt of some weight. It is, however, not so much an argument against regulation as such as against the administrative machinery of regulation. There is undoubtedly a deplorable lag between changed conditions and changed commission rulings limiting rates or return. But this evil is self-correcting and is perhaps partially offset by the fact that, whereas this lag is now to the detriment of the utilities, in times past it has probably more often been to the detriment of the public. The alternative to this situation, namely, allowing the utilities to accumulate a large surplus upon which to draw in "lean years" offers nothing which is not more difficult and perplexing than the condition which now confronts us. There is no doubting that regulation should be made to move more swiftly and effectively than it has in the past. This is largely a question of procedure and not one of fundamental consequence.[1] Service-at-cost, to be discussed at length in a later chapter, is oftentimes called "automatic regulation."

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[1] It is interesting to note in this connection the suggestion occasionally put forth by representatives of the utilities that the losses which this lag has caused them be amortized through temporary fare increases. See article by Cooke, C. B., Jr., "Simplification of Corporate Structures," *Electric Railway Journal*, November 8, 1919, pp. 858–61; also Metcalf, Leonard, "The Effect of the War Period, 1914–1918, and Public Control upon the Water Works of the United States," *Journal of American Water Works Association*, November, 1919, pp. 785–803.

Regulation and Politics

Regulation has not been taken out of politics. While this is extremely unfortunate, since the securing of an impartial and expert administration of the law was one of the principal objects had in mind at the inception of the commission movement, it is no doubt a perfectly natural result of a situation in which politics and business cannot be completely divorced. Regulation by its very nature is an attempt to reconcile two divergent interests through public, that is, political, action. It is therefore only natural that one or both of the parties affected should attempt to control its workings. Politics is the means of so doing. This one factor perhaps does as much as all others to upset all calculations made on purely rational bases and takes away that direct relation between cause and effect, between act and result, that is a fundamental condition to any program of improvement. There is no intention of minimizing the importance of this factor in speaking of it so briefly here; in fact its very great importance should be fully appreciated. It is, however, difficult to say anything new on the subject. Politics tells on the efficiency with which utilities are managed through making it necessary or possible to transfer the attention of utility operators from operating efficiency to political efficiency and of the public from service to political wrangling. How much influence on efficiency politics has exerted will never be known exactly. It is ramifying and gets into the vitals of the utility problem. It stands ever in the background as a counter-determinant, a potent factor working against scientific regulation and one whose presence cannot be forgotten, however much to do so might simplify the present task.

Regulation and Service

Service is an important element of efficiency and in fact is essential to any determination of the broader concept.

Good service or the best service can be had at one cost, moderately good service at another, and poor service at another. Every analysis of efficiency, whether in monetary or physical terms, should be thrown against a background on which is depicted the quality of the service rendered. Otherwise efficiency is meaningless, much as would be a low or a high price for a commodity without any statement of the quality of the commodity.

There can be no doubting the fact that commission regulation has tended greatly to raise the general standard of service rendered by public utilities. Quite properly the commissions have placed the emphasis on good service as opposed to poorer service and lower rates. Thus in many instances they have conditioned rate increases or increases in the rate of return upon a betterment of service and have actually in some cases designated certain means by which the service could be improved. Aside from this very important influence the commissions have tended to unify and codify the service standards for the various utilities under their jurisdiction.[1] The fact that relatively few states have telephone service standards indicates the undeveloped condition of that industry and the difficulty of compressing good telephone service into a few rules. Through this means the state commissions have drawn the performance of many laggard utilities up to the standard established by the state and discouraged willful neglect of good service. No less have they tended to discourage extra high standards of service. These may possibly have been unnecessary or, again, they may have been due to local political conditions from which the utilities could not be released except through the intervention of some outside agency. The general effect has been, therefore, to establish something of a level to which standards of service have tended to gravitate. In this way commission regulation has tended to standardize one of the factors contained in the efficiency concept and to make it somewhat easier to obtain light on the efficiency with which utilities are managed. It has tended to reduce friction between the utility and the public. There can be no doubt that so far as control of service is concerned commission regulation has functioned as was expected and greatly to the advantage of both the consumer and the utility.

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[1] See Appendix I for states which at present have state-wide standards for gas, electric, water, telephone, and central station heating service.

Regulation and Utility Financing

Passing now to a consideration of the effect of commission regulation on public utility financing and on the utilities' day-to-day operating conditions, and through these means on the efficiency with which they are managed, these may be said to be particulars in which the commissions have assumed some of the duties which under strict interpretation more properly belong to the management of the utilities themselves. But the fact remains that it is an impossibility for the commissions entirely to avoid taking some part in the direction of the utilities under their jurisdiction.

The laws of most of the states which have thoroughgoing utility regulation require the commissions to pass upon the issuance of securities and, in some states, the law goes so far as to require the commission to exercise general supervision over the manner in which the money thus raised is expended.[1] Whatever the extent of this control, there is an unmistakable tendency for the commissions somewhat to share with the investor the responsibility in the making of new investments. While, as stated above, there is no guarantee of a return on the investments made,[2] still the fact that the commissions have exercised some discretion in allowing the companies to issue new securities and to finance additional investments, is sufficient to warrant the statement that the commissions do exercise some control over the course of the investments. This effect is promptly disclaimed by some commissions, as in the California case quoted below, while others positively assert that they feel that it is their duty to guide the course of investment, as in the Nebraska case also quoted. While the former attitude is the more common, it is doubtful whether it faces the facts of the case as squarely as does the second.

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[1] See analysis by Barron, M. L., "State Regulation of the Securities of Railroads and Public Service Corporations," *Annals American Academy of Political and Social Sciences*, vol. 76, pp. 167–90, March, 1918, and Baldwin, C. D., *Capital Control in New York*, 1921.

[2] Indeed, in seven states the statutes expressly state that the approval

> The public utilities act of California does not contemplate that the Commission shall exercise the function of determining whether an issue of securities is or is not a good investment, but does contemplate that the Commission shall, in the exercise of its duties, see that the utility receives adequate return for the stock which it issues.[1]
>
> The Commission must protect the public against unjust charges for service, discrimination and inadequate facilities, and at the same time give encouragement to the introduction and maintenance of such utilities as are demanded by the economic conditions of the community. In other words, the Commission's primary function is not that of protecting property from confiscation, but rather that of encouraging the development of such utilities as the best interests of the community demand, at the same time conserving the rights of the public in their establishment. . . .
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> We believe that it is to the interest of this state where the introduction of street car interurban service has not yet been fully developed, to adopt a policy that will encourage, rather than a policy that will discourage, the investment of money in such enterprises.[2]

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by the state authorities of the issuance of securities carries with it no guarantee of any kind.

[1] *Re* Pacific Gas and Electric Co., P.U.R. 1915C, 324.

[2] City of Lincoln *v.* Lincoln Traction Co., 4 Nebraska State Railway Commission Reports, 95 (1911). This statement of policy is the more significant in view of subsequent developments in the interurban field. Of all public utilities the interurban seems to be the most afflicted with troubles, some of which are of a permanently serious character.

In further elucidation of the point that the commissions do exercise

Granting the fact, what is the effect of it? It can be only the usual effect of a division of responsibility. While nothing can be stated in this connection with entire positiveness, the effect would seem to be to undermine some of that self-reliance which characterizes uncontrolled individual action. But more important than this effect is this further one, viz., that it tends, as does the reduction of the speculative element in utility management above referred to, to produce more conservative management, management which is interested less in the stock speculation and all that it implies and more interested in the permanent good of the undertaking. So far as this latter is the case many helpful effects upon efficiency can be seen arising from commission control of security issues.

Another consideration to be mentioned in this connection is the influence of state accounting control on utility financing. A detailed discussion of this matter appears in a later chapter. It may be noted here, however, that while such control here, as elsewhere, tends to lessen and ultimately to eliminate the profit element, it also tends to lend stability to utility management through furnishing the fact basis upon which good business judgment can be exercised. This influence of the state commissions is limited, of course, to the smaller or less progressive utilities, since the larger ones always have been and still are in advance of the commissions in matters of accounting.

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control over the course of investments the following is taken from an address of the chairman of the Indiana Public Service Commission before the American Electric Railway Association:

"Industrial expansion within the next twenty years will depend, in my opinion, more on the development of cheap electrical power than on any other single factor. We have got to make the development of electric power attractive to the investor or his money will go elsewhere. Here in Indiana the Public Service Commission is doing everything it legally and morally can do to encourage this development in the sincere belief and confidence that it will redound to the benefit of the whole state. We take pride in what we have done already in this direction." (*Aera* March, 1922, p. 681.)

The Participation of Regulating Commissions in Management

Proceeding a step further, what evidence is there that the commissions tend actually to usurp, perhaps against their own will, the functions of management? The commissions commonly disclaim any intention to interfere in the management of a utility.[1] Some hint of this has been contained in their control of the utilities' capitalization. A complete answer to this question would require a philosophic temper and an abundance of first-hand experience in utility regulation. However, by putting one's self in the position of the commission, one can fairly accurately discern the fact that the commissions must, in making their decisions, consider the effect of these decisions on the operations of the utilities and to that extent must exercise a managerial function. Furthermore, in some cases the commissions have gone out of their way to suggest to the utilities courses of action which the latter's own knowledge or experience did not prompt.[2]

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[1] Thus in the case of Fond du Lac Business Men's Association *et al. v.* Wisconsin Telephone Co., 4 W.R.C. Reports, 340 (1909), the Wisconsin Railroad Commission said:

"A careful reading of the Public Utilities Law will disclose that the objective point in the legislative mind was the regulation of those affairs of public utilities by public authority which pertain to and are involved in the discharge of their obligations to the public. It was not the intention to confer upon the tribunal charged with the duty of supervision the general management of the business of such concerns. The function of the Commission is, therefore, naturally limited in its scope to the execution of the primary purposes of the enactment."

Again, the Georgia Railroad Commission said in *Re* Georgia Railway and Power Co. (P.U.R., 1915A, 901):

"It is not within the power of the Commission to operate street car systems and to lay out all their schedules, its province merely being to compel reasonably adequate and efficient service, leaving the details of management and operation to the company."

[2] Thus in the Bay State rate case the Massachusetts Public Service Commission recommended increasing the speed of the cars, using particular types of cars, fare boxes, centralization of repair and inspection

In so far as the commissions do exert an influence on, and in fact participate in, the management of the utilities under their jurisdiction, they tend both to increase and decrease the efficiency of operation of these companies. Thus in any event a division of responsibility results and this in turn commonly leads to a dissipation of effort and inaction on the part of the company. Especially is this the case where the action of the commission seems arbitrary or illogical. In those other cases where the commissions give needed advice to the utilities their action cannot but tend to level up general operating conditions in the state, since the commissions merely make more generally available knowledge and experience which they have acquired in

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work, greater cleanliness of cars and even a better way of disposing of scrap material. (P.U.R., 1916F, 221.) In Nuckolls County Independent Telephone Co. (P.U.R., 1921C, 593) the Nebraska Commission said: "The plant is economically built but not properly managed. . . . There have been frequent changes of operators, probably due to the scale of wages paid. . . . This company has an excellent secretary, who looks after most of the complaints, takes care of the books . . . and acts as general manager after a fashion. He is paid a salary entirely incommensurate with the duties he is presumed to perform. . . . The company will be expected to select a manager to have charge of the physical plant."

In the case of the Ukiah Gas Company the California Commission censored the utility for not making carbon black with its excess natural gas, thereby reducing the cost of gas to the consumer. (*Gas Age*, June, 1919, p. 656.) Cases such as the foregoing could readily be multiplied. Cf. in this connection the work of the Board of Trade in England and similar bodies on the Continent. (Whitten, "Regulation of Street Railways in England and Prussia," *Report of Public Service Commission*, First District, New York, 1908, vol. I, pp. 213–14.) See also Whitten's discussion of the official revision system for the regulation of London gas companies, instituted in 1871 and abandoned in 1874, wherein is pointed out the difficulty of official determination of "due care and management." (*Regulation of Public Service Companies in Great Britain*, 1914, p. 113.)

For an interesting case in which the issues are sharply presented, see Interstate Commerce Commission decision No. 12,066, Construction and Repair of Railway Equipment, Pennsylvania Railroad Company, and others, rendered March 7, 1922. The question of what constitutes "honest, efficient and economical management" is certain to be a troublesome one, but a definitive answer to it, whenever it is made, necessarily will be a recognition that commission management is a fact that cannot be gainsaid.

particular cases. The net effect is difficult to ascertain, since it is impossible judiciously to weigh the counterbalancing forces above referred to. The opinion may be hazarded, however, that an intelligent and active commission can overcome by positive assistance many of the harmful effects which its interference in management has produced.

Regulation and Initiative

The question of the effect of regulation on initiative is really the heart of this whole treatise. Regulation means control of individual wills. Can there be control without repression — this is a fundamental question.

While it is assumed, and properly, that individual initiative is a desideratum in utility management to-day, it may well be that what we desire we cannot have, at least in its entirety, and that less of it and more of something else will have to be expected. These alternatives will be discussed later. The problem at just this time is to state as briefly as possible the effects of commission regulation on the exercise of individual initiative.

There can be no escaping the general answer which must be given to this question. Commission regulation, in fact any sort of regulation, puts a damper on individual initiative. This statement should not be taken too literally, however, for any social institution, any régime of law, does likewise. But while these latter tend more to set up the conditions under which individual initiative can be exercised, commission regulation goes farther than this. It both sets up the general condition under which utilities are managed and, as has been seen in the preceding discussion of regulation in its relation to the speculative element, to service, to utility financing and to utility operation, it actually supplies decisions which would otherwise have to be made by the individuals engaged in management. In doing this it supplants private initiative and indeed discourages its exercise in other particulars. The general effect which follows from this is benumbing, stifling. No other words exactly express the meaning to be conveyed. It tends to produce a halting, divided and less resolute policy that than which had characterized the earlier days of utility management. A great change has come over this industry, and herein is seen one of its most striking effects. Mr. Samuel Insull, the well-known utility operator and financier, has expressed himself very tellingly on this subject, as follows:

> One of the drawbacks of the commission form of regulation . . . probably will be to check initiative, to make the utility manager hesitate as to whether he will try to put in a new experiment, and to put him in the position where he will be infinitely more cautious, if he has consideration for his own peace of mind, about whether he will launch out in some radically new departure, either as to business methods or apparatus used, or be content to go along quietly the even tenor of his way, and simply operate what he has got to the best advantage.[1]

A Concrete Example

Perhaps a single concrete illustration of the kind of effect here had in mind will make the meaning clearer. Let us assemble within brief compass the essentials of utility regulation. Assuming a condition of non-regulation as a starting-point, there may be said to exist at first an uncontrolled effort on the part of utilities to earn all they can and in any manner they can. Regulation is introduced[2] and the rates of charge are examined, both as to their absolute amount and as to the relative amounts charged various individuals and classes of consumers. A reduction of rates may take place. As a step in this process a valuation is made, normal operating expenses are determined and a rate of return is established which tends to be the same as that generally applied to all utilities of like character. Rates are so established as to yield this return and presumably no more.

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[1] *Gas Age*, September 1, 1919, p. 23.

[2] Municipal regulation of some kind of course already existed, but this commonly was inflexible or capricious.

Time elapses and conditions change. The community served grows, costs rise or fall and other vital matters undergo change. The company's net income increases and dividends are declared in large amounts or else means are sought for covering up the excess earnings. Complaints are made, a new rate case takes place, and a further reduction of rates occurs with a view to the reduction of the company's return to a fair return on the fair value of its property. It is in these intervals between rate cases that one of the most enervating influences of commission regulation may be felt. If the utility feels that all of its efforts at economy and efficiency are to be absorbed in reduced rates it will cease trying to reduce its costs, at least to the extent to which it does not see that decreased costs and decreased rates are essential elements of strength. In the following chapter the motives which are at play in the management of public utilities are analyzed and the predominating influence of the pecuniary motive is there shown. Anticipating this discussion, it can quite readily be seen that extra and bold effort will not be put forth if the sole result thereof is a benefit to the public and none to the utility.[1]

A number of the early state laws granting charters to railroads contained provisions limiting the profits which might be retained by the companies.[2] The effect of such a provision was to cause the respective railroad managements so to conduct their affairs that the necessity for such change of rates would never present itself. Capital expenditures were charged to operating expenses and, more vital for our purposes, traffic was not developed as fully as it would have been had there not been this restraint. This is said to have resulted in considerable stagnation.[1] Such provisions were not enforced, although there were instances of long legal controversies between the companies and the states, and the newer charters did not contain them. Regulation to-day accomplishes much the same result, although the working of the influences thus brought to bear on the motives of management is much less obvious. If the process were as clearly formulated as it was in these early statutes its insinuating influence would at once be recognized and remedial measures taken to overcome it.

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[1] The efforts that are being made by the commissions to overcome this result are set forth in Chapter VI.

[2] Thus, to cite a single example, the charter granted the Boston and Lowell Rail Road Corporation, in the early thirties, provided that a "toll be, and is hereby granted and established, for the sole benefit of said Corporation, upon all passengers and property of all descriptions which may be conveyed or transported upon said road, at such rates per mile as may be agreed upon and established from time to time by the Directors of said Corporation. . . . Provided, however, that, if at the expiration of four years from and after the completion of said road, the net income or

Of course the effect here attributed to commission regulation depends on a number of factors. Thus knowledge that the commission and the public are indifferent, long intervals between the periods of regulation, lack of knowledge of the utilities' affairs and the like will offset to some extent the tendency to discourage initiative. But certainly there is no mistaking the fact that operating efficiencies will be allowed to fall and operating costs to rise when a rate case is imminent; whether there is recovery from this paralysis of effort later will depend, as has just been stated, very largely on the company's

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receipts from tolls, and other profits, taking the four years aforesaid as the basis of calculation, shall have amounted to more than ten per cent per annum upon the cost of the road, the Legislature may take measures to alter and reduce the rate of tolls and other profits, in such manner as to take off the overplus for the next four years, calculating the amount of transportation upon the road to be the same as the four preceding years, and at the expiration of every four years thereafter the same proceedings may be had." (Statutes, Boston and Maine Railroad System, vol. I, p. 3.)

[1] For citation of authorities on this point see White, L. D., "The Origin of Utility Commissions in Massachusetts," *Journal of Political Economy*, vol. XXIX, no. 3, March, 1921, p. 186.

estimate of the likelihood of its being able to retain the savings which extra effort on its part may make possible. There also is no denying the more fundamental consideration, *viz.*, that a premium is placed on weakness and inertia and a discount on bold, energetic, and sustained action. The general result in every case will be to discourage the putting forth of extra efforts.[1]

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[1] Professor R. E. Heilman has taken a somewhat different attitude on this matter. In commenting on Professor John Bauer's paper, "The Federal Valuation of Railroads," *American Economic Review*, vol. VIII, no. 1, pp. 128–29, Professor Heilman says:

"Whatever may be said regarding the defects of our present system of regulating utility rates it does have the virtue of inducing and rewarding efficiency. Specific rates are set at a given point — estimated to produce a certain return. If, while such rates are in effect the company can by increased efficiency lower its costs of operation, it profits by that fact until rates are again lowered, which may be for a considerable period. It might be better if we were frankly and openly to recognize the necessity of inducing and rewarding efficiency, by some system of bonus, or otherwise. . . . But until we have devised some other plan of inducing and rewarding efficiency, it would be unwise to abandon the present system, and to introduce in its stead a plan, not of regulating rates, but of fixing profits — a plan which would inevitably lead to slackness, inefficiency of operation, and lack of progress."

This statement should be compared with the following, made by a company official:

"These conditions have paralyzed all incentive to economy in utility business and no stable financial conditions can be created until they are remedied. The biggest handicap to a utility is to appear before a utility commission with a record and data showing effective operation and careful, economical management. The result is verbal commendation but the establishment of a lower rate than is allowed another company not so well operated or managed.

"There is really now no incentive to economy, nor any incentive to expend effort and money to stimulate expansion of business. If money is spent in improved equipment to effect material economies in operation, and thus increase your rate of return over the six per cent or seven per cent allowed you, the commission will eventually confiscate this excess and maybe more and will also confiscate part of the capital you have invested to procure these economies, fixing a so-called depreciated value on the property representing this capital." (Statement of R. Schaddele before Federal Electric Railways Commission, *Electric Railway Journal*, August 2, 1919, pp. 240–42.)

Utility and Public should share the Benefits of Increased Efficiency

It is constantly to be borne in mind, of course, that for this necessary and natural shortcoming of regulation there are compensating advantages. The alternative, taking off all restrictions, would be so harmful that no one would seriously propose it to-day. The possibility of sharing between utility and public the results which individual initiative produces and public necessity makes possible is the only way out of this dilemma. It is to this problem that this treatise is principally devoted.

Differences in Opportunities

Differences in opportunities are represented by external conditions over which the individual management has relatively little control. For purposes of analysis these have been grouped under the following heads: (a) size of plant, (b) age of plant, (c) changes in the characteristics of the community served, (d) politics and other similar local conditions, favorable or unfavorable.

Effects of Size

It requires no lengthy analysis to demonstrate that efficiency, if thought of as a relationship between the attainable and the attained, is not possible in like degree with all sizes of plant. Thus the statistical tables given in the preceding chapter contained evidence of this relationship between size and efficiency, for the coal consumption and unit costs varied somewhat, although of course not proportionately, with the size of the plants.[1] While there is no inherent reason why a small plant cannot be as efficient as a large one in an engineering or operating sense, just as soon as cost is brought into the efficiency concept the advantages are all with the larger plant. There is of course the possibility of exceeding the most efficient size of plant. The fact remains that it is the smaller plants which make the poorest showing even when rated from the engineering standpoint. The employment of men who are less capable and less specialized than the men employed by the larger companies, the hand-to-mouth existence of many small plants, the inability to experiment — these and other characteristics account for their poorer showing. Using the word efficiency in its broadest sense, a similar relationship between efficiency and size obtains. While possibly closer supervision of details is possible with the small plant, the excessive overhead expenses more than offset the special economies which are possible for the small plant. As has been stated, utilities must be classified and standards of efficiency set up which take account of all of the pertinent conditions under which each class operates. In fact, in each of the utility fields there is a minimum size of plant which it will pay to operate. Many small places are to-day paying very dearly for gas, electricity, and electric railway service simply because their size did not warrant the original investment in the plants supplying these services. Once the original investment had been made

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[1] As stated above, the United States Fuel Administration endeavored to close down the smaller isolated (and central) plants because of the disproportionate amounts of fuel which they consumed. There is a general tendency toward interconnection and absorption of smaller generating units into larger ones. Thus in England legislation has recently been passed avowedly for this purpose in the case of electricity (see "Local Au-

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thorities and the Electric (Supply) Act — a Far-Reaching Measure," *Municipal Journal*, London, January 2, 1920, p. 9), and in Germany during the war the government encouraged in every possible way the concentration of the production of gas and electricity in larger producing units. In the United States much is now being said about interconnections in the electric field and of superpower systems which would link up great generating plants situated near the places of great natural water power or near coal mines, while the smaller units are left to perform only "standby" or "peak load" service. See on this subject the recent elaborate report by W. S. Murray and others, "A Superpower System for the Region between Boston and Washington," United States Geological Survey, Professional Paper no. 123, pp. 261, 1921.

operation had to be continued, if in any way possible. It is significant, moreover, that receiverships and abandonments have occurred of late in greater measure among the smaller companies.

Effects of Age of Plant

In industries in which notable progress is being made in the development of technical processes and equipment, the older plants are necessarily handicapped in comparison with the newer ones. Such technical development takes place to a large extent outside of the utility companies themselves.[1] The greatest importance must be attached to the work of the manufacturers of the appliances used by public utilities. The value of their work, as well as its bearing on the general question of progress and efficiency in the utility industry, is commonly overlooked. Such manufacturers are, of course, subject to none of the regulations which control public utilities. This condition of freedom is of great practical importance. The steam turbine in the electric industry, the by-product coke oven in the gas industry, the light-weight and one-man car of the electric railway, are examples of contributions of such agencies. Some of these contributions have been revolutionary. The tungsten filament for the incandescent lamp, developed outside the central station industry, might have caused considerable hardship in that industry had the introduction of it there been uncontrolled.

A plant which has installed electrical equipment of a certain type is more or less compelled to continue to use that equipment, despite the fact that more efficient equipment has come on the market, unless it is fortunate enough to be earning sufficient to amortize its existing investment in a relatively short period and is operated by men of sufficient foresight to see the need for keeping in touch with and making use of the latest in technical developments. Old gas plants particularly are apt to be using very inefficient methods of coal carbonization and gas purification. Many street railway managers would no doubt readily adopt the light-weight, one-man street cars which are now coming into use because of the saving in labor, power, and maintenance costs which they make possible, if it were not for their present investment in older equipment. A utility which is loaded down with a heavy investment in equipment in vogue at an earlier day is usually unable to discard it as readily as the requirements of efficiency demand. This is especially true of the telephone industry, in which marvelous advances are being made at close intervals. The union of research, invention, and operation lessens the danger to existing investment, but a very large factor of safety must nevertheless be provided for.

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[1] A very profitable study could be made of the sources from which improvements in processes and equipment in the utility field have come. It is true that many, particularly those of a less revolutionary character, have come from within the utility industry itself. In other cases the manufacturer of appliances is also engaged in utility operation, usually under a different corporate identity, as in the case of the Westinghouse and General Electric companies.

Effects of Changes in Characteristics of Communities served

There are often unexpected and unpredictable changes in the population and industries of the community served by a utility. Thus population may suddenly slacken its growth or actually decline and a community dependent upon one or a few manufacturing establishments may suddenly be left bereft of them all. An electric railway or telephone company may find a shifting of the business center of a community taking place which entirely disarranges its previous calculations. Telephone companies are particularly mindful of such possibilities as this. Any such event would obviously reflect itself very noticeably in the welfare of the company supplying utility service of any kind to such a community. Again, a railroad or steamship line which had been bringing the utility's coal to it might discontinue its service and in other ways a utility may be put to an unexpected disadvantage in obtaining raw materials. To some extent such disappointing experiences as these are due to lack of foresight and good business judgment on the part of the owners and managers of the utilities themselves, but to no small extent they are due to circumstances beyond the control of the type of men who are looked to for the development of such utility services in the average American community.[1]

Effects of Politics and Other Local Conditions

As has been intimated, politics plays an altogether too prominent and disturbing a part in the affairs of American public utilities. No small portion of the utilities' troubles is attributable to the attitude of local politicians and civic reformers. There is no need for discussing this subject in all of its ramifications. It is sufficient for present purposes to say that a utility management which is confronted with a political situation which can only antagonize it, and with a public which fails willfully or otherwise to appreciate its endeavors to be efficient, is apt to lose sight of efficiency and to put connivance and manipulation above all other considerations. It is traditionally the part of the public to play the rôle of the merciless critic, and when the intensity of this attitude is increased by the more or less well-intentioned criticisms of the ever-present civic reformer, the real merits of the situation are often totally buried in endless controversies on points which really are not vital. To be sure, efficient management can partly counteract and perhaps in time cure this attitude of hostility which the public so often displays, but to do so is an extremely difficult and slow process and one in which the work of years may suddenly be lost in some false move which it was humanly impossible not to make.

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[1] A case in point is that of certain utilities in Duluth, Minnesota, and Superior, Wisconsin, which in anticipation of a rapid growth of these cities had built far in advance of actual needs. When the boom expected did not materialize these companies were left short-handed and asked a going value allowance for the losses sustained. The Wisconsin Commission has stated its policy in such cases in this manner:

"The early losses or deficits, or the amounts by which the earnings of the plant have failed to meet the ordinary operating expenses, taxes, depreciation, and a reasonable return on the investment, will, in the majority of cases, very closely measure the cost of developing the business. Deficits from operation, however, cannot equitably be taken into account in the appraisals of plants regardless of the conditions under which they were incurred. Deficits due to abnormal conditions, bad management, poor judgment, extravagances, lack of ordinary care and foresight, and extremely high capital charges, etc., it is clear, should receive very little consideration. Nor does it seem clear that losses due to lack of growth or retrogression of community development should be charged in their entirety against the consumers, even though the sacrifices of the owners have been prudently made. Returns upon such total costs may result in rates not reasonably within the value of the product or service to the user." (Appleton *v.* Appleton W. Wks. Co., 1910, 5 R.C. 215, 276; Cunningham *et al. v.* Chippewa Falls W. Wks. & Lt. Co., 1910, 5 R.C. 302, 314; City of Milwaukee *v.* T. M. E. R. & L. Co. *et al.*, 1912, 10 R.C. 1, 122; Superior Comm'l Club *et al. v.* Superior W. Lt. & P. Co., 1912, 10 R.C. 704, 742–44, 803.) See also *Utilities Magazine*, vol. I, p. 158, 1915.

Syndicate Plants

In this connection it is important to note that the so-called syndicate plants are better situated in nearly every one of the four respects named than the plant which is owned locally. A syndicate plant is one which is part of a group of plants owned by a common holding company, perhaps by means of one or more intermediate holding companies. Ownership and control are not local. As a rule these syndicates embrace several, if not nearly all, fields of utility operation. At least one half and probably considerably more of the capitalization of electric, gas, telephone, street and interurban railway companies is controlled by syndicates. Surprisingly little has been written about them.[1] The centralized management which these syndicates make possible leads to a greater degree of progressiveness and efficiency in the operation of the plants which they control and tends to offset to a limited degree the deterring factors of size and age. These syndicates combine the command over greater engineering, financial, and administrative talent with greater financial strength and a broader outlook, whereby they are enabled to avoid many of the pitfalls mentioned above.[1]

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[1] For a map showing the respective territories of several syndicates in the electrical field, see *Electrical World,* May 17, 1919, pp. 986–1037.

But syndicates usually bear in even larger measure than the locally owned plant the burden of public criticism, which in their case often takes the form of dislike of "absentee ownership." Partly for this reason and partly because of the difficulties being experienced at present in obtaining investment funds, a campaign is being waged by some of these syndicates to build up sales of local utilities' securities to their own customers. Customer ownership is being hailed as a great economic compromise and a move that will give all the advantages of public ownership and yet retain those of private operation. How far this argument is genuine and how far specious cannot at this time be determined.[2] The movement has interesting possibilities, and dangers as well. The greater number of stockholders which customer ownership involves makes possible a still greater degree of centralization of financial control and to that extent increases the possibilities of financial manipulation.

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[1] It is interesting to note how large a percentage of the highly paid men of the country are in the service of the public utility syndicates. See article by E. M. Woolley, *McClure's*, April to October, 1914. An analogy exists between the so-called "trusts" and these syndicates. Dewing, at page 529 of *Corporate Promotions and Reorganizations*, refers to the failure of the promoters of "big business" to take into account the fact that greater organization demands greater "skill of management," and that "skill of management is not more easily attained because of elaborate organization." Possibly the utility syndicates will feel the effects of this same difficulty. Mention is hereinafter made from time to time of the elaborate systems, educational and corrective, which have been developed by the syndicates to overcome any such effects.

[2] See Report of Committee on the Sale of Company Securities to Customers and Resident Citizens, *Bulletin of National Electric Light Association*, June, 1919, pp. 328–31.

There are also so-called "management syndicates" which undertake to manage local utility properties for fees. Such work is often done by the holding company type of syndicate in addition to its other functions. Where there is ownership, direct or indirect, in addition to management there arises a very difficult question as to the equity of allowing the full amount of the fee charged to be included in operating expenses.[1]

Differences in the Capacities of Individuals

Aside from, and yet partly because of the relatively non-competitive nature of public utilities, the regulation to which they are subject and differences in opportunities, there are other matters which condition the efficiency with which public utilities are managed. These have been grouped under the head of "differences in capacities of individuals." Reference here is, of course, solely to the capacities of the management, for it is the directing force through which the other capacities engaged in utility operation are rated and placed in the economic scale.

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[1] The American Telephone and Telegraph Company presents a somewhat peculiar form of syndicate control and management. The numerous telephone companies comprised in the "Bell system" — 145 in number in 1917, doing in the aggregate approximately three fourths of the telephone business of the country — have a contract with the parent company whereby there is turned over to the latter 4½ per cent of the gross receipts of the local company as a payment for the use of instruments which it, through its subsidiary, the Western Electric Company, manufactures, and for legal, engineering, financial, and other assistance. While it appears to be generally agreed that some valuable consideration is received by the local company for which payment to the parent company should be made, there has always been more or less distrust on the part of both the public and the commissions of the amount and form of such payment. Thus, in Central Union Telephone Co., P.U.R., 1920B, 813, the Indiana Public Service Commission objected to this payment on the ground that 4½ per cent of the gross receipts of the operating company is no exact criterion of the service rendered to the local company, and in the case of Michigan State Telephone Co., P.U.R., 1921C, 545, the Michigan Public Utilities Commission said "the principle by which a rate increase automatically increases operating expenses is wrong." A similar view was expressed in *Re* Southern Bell Telephone and Telegraph Co., P.U.R., 1921C, 833, by the Georgia Railroad Commission. See for a full discussion of this subject *Re* Chesapeake and Potomac Telephone Company, P.U.R., 1920F, 417.

No two individuals if given charge of the same plant would get exactly the same results from it and some would be eminently successful where others would fail utterly. Between these two extremes there are all possible grades of ability and capacity. These obvious truths are mentioned simply to complete the argument and to supply all of the factors which account for the efficiency with which utilities are managed. In the next chapter the factors engaged in the management of public utilities are discussed and incidentally some of the personal qualities which are essential to successful utility management are touched upon.

Causes of a more Temporary Character

Let us pass now to a brief consideration of certain recent developments which have either directly caused inefficiency to increase or have accentuated preëxisting conditions which make for inefficiency. Reference here is principally to changes in the price level and their effects. These changes have brought matters abruptly to a head in the case of several kinds of public utility, particularly the electric railway industry and to a less extent the gas industry.

Effects of Increased Costs

No proof is needed of the fact that changes in the price level have been almost revolutionary since 1914. The question here is rather the determination, as concisely as possible, of the extent to which the operating costs for public utilities have increased and the effect of this increase. It is necessary to state these price changes in terms of the commodities and services which are used by utilities and to weight the individual items in keeping with the extent of their use. No carefully prepared, extended data are available on this subject, although there has been a great mass of *ex parte* evidence offered. However, a paper by F. W. Doolittle, presented before the American Electric Railway Association in October, 1919, in which are stated the effects of the 1914–19 price increases upon the income and outgo of a hypothetical electric railway, may be drawn upon.[1] In this paper the weighting referred to above is fully taken care of. Table XV presents the most significant of the data developed by Mr. Doolittle.

TABLE XV. REVENUES AND EXPENSES OF A HYPOTHETICAL ELECTRIC RAILWAY — 1914 AND 1919

(a) *Condensed income account-standard classification*

	1914		1919	
Operating revenue		$5,000,000		$5,000,000
Operating expenses (including replacement insurance)[1]		3,750,000		6,163,000
Maintenance of way and structures	$575,000		$875,900	
Maintenance of equipment	575,000		970,300	
Power	615,000		1,149,000	
Conducting transportation	1,225,000		2,225,000	
General and miscellaneous	385,000		492,800	
Taxes	375,000		450,000	
Net operating revenues		$1,250,000		$1,163,000 ■

[1] Maintenance of way and structures	$320,000
Maintenance of equipment	110,000
Power	70,000

■ Deficit.

(b) *Condensed income account-functional classification*

	1914		1919	
Operating revenue		$5,000,000		$5,000,000
Operating expenses (including replacement insurance)[1]		3,750,000		6,163,000
Costs varying with car-hr	$1,125,750		$2,049,050	
Costs varying with car-mile	876,950		1,482,720	
Costs varying with mile of single track	150,000		312,620	
Cost varying with number of passengers	332,800		486,490	
Costs of electrical energy (car-mile)	472,500		930,100	
Administrative and overhead expense burden	417,000		452,020	
Taxes	375,000		450,000	
Net operating revenues		$1,250,000		$1,163,000 ■

[1] Cost varying with car-mile	$210,000
Administration and overhead expense burden	290,000

■ Deficit

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[1] *Electric Railway Journal*, Convention Number, October, 1919, p. 10. It is not necessary to present all of the assumptions made by the author. The computations are stated to have been based on an examination of the records of several large companies and upon the material gathered by the statistical bureau of the American Electric Railway Association.

(c) *Costs per unit*

		1914	1919
Operating expenses (including replacement insurance)			
Costs varying with car-hour		$0.60	$1.09
Costs varying with car-mile		.05	.085
Costs varying with mile of single track		400.00	835.00
Costs varying with number of passengers		.33	.40
Costs of electrical energy (car-mile)		.027	.053
Administrative and overhead expense burden Taxes	per cent	26.8	17.1

One can with difficulty appreciate the very great seriousness of the "plight of the tractions" and of other utilities in much the same degree until he has carefully studied such exhibits as these. How very considerable the fare or rate increase must be to compensate for such an increase in costs as this is apparent.

The immediate effect of such an increase in costs was the encroachment upon and in some cases the entire annihilation of net income. It is true that rate increases were granted by the various regulating bodies, but these were tardily granted and were rarely sufficient in amount to compensate fully for the increased costs.[1] In many cases the specter of increased competition was also encountered, as in the case of jitney competition with electric railways.

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[1] Conditions in the case of all the utilities became very acute in 1917, as the following table relating to the electric railway industry shows:

Rate of fare	1917 Number of cities	1918 Number of cities	1919 Number of cities	1920 Number of cities
10-cent cash fare	..	..	25	57
9-cent cash fare	..	..	1	4
8-cent cash fare	..	12	12	23
7-cent cash fare	..	33	64	89
6-cent cash fare	25	78	73	61
Central area zone system with outlying "copper" zones	1	13	4	[illegible]
5-cent fare with charge for transfers	1	8	4	1
Uniform rate zone systems	4	6	14	11
5-cent reduced rate tickets abolished	5	27	20	18
Original 5-cent fare (no increase)	264 [1]	123	83	34
Total	300	300	300	300

[1] Includes 4-cent fare in Cleveland.

(*Aera*, February, 1921, p. 697.)

The table quoted shows how very extensive the increase in street railway fares has been, but also how long it took to get public opinion "mobilized." A similar condition existed in the case of the other utilities. For list of changes in gas rates, see current lists in *American Gas Association Monthly*.

The gas and electric utilities, especially the latter, on the other hand, found their plants overloaded with an onrush of business which required a costly extension of their plants to handle. Taking a single utility, the electric railway, the one whose condition was most affected, we find the following receiverships and foreclosures.[1]

TABLE XVI. RECORD OF ELECTRIC RAILWAY RECEIVERSHIPS

Year	Number of companies	Miles of single track involved	Outstanding securities	
			Stock	Bonds
1909	22	558.00	$29,962,200	$22,325,000
1910	11	696.61	12,629,400	75,490,735
1911	19	518.90	29,533,450	38,973,293
1912	26	373.58	20,410,700	11,133,800
1913	18	342.84	31,006,900	47,272,200
1914	10	362.39	35,562,550	19,050,460
1915	27	1,152.10	40,298,050	39,372,375
1916	15	359.26	14,476,600	10,849,200
1917	21	1,177.32	33,918,725	33,778,400
1918	29	2,017.61	92,130,388	163,257,102
1919	48	3,781.12	221,259,354	312,915.104

TABLE XVII. RECORD OF ELECTRIC RAILWAY FORECLOSURE SALES

Year	Number of companies	Miles of single track involved	Outstanding securities		
			Stock	Bonds	Receiver's certificates
1909	21	488.00	$22,265,700	$21,174,000	(a)
1910	22	724.36	19,106,613	26,374,075	(a)
1911	25	660.72	91,354,800	115,092,750	(a)
1912	18	267.18	14,197,300	10,685,250	(a)
1913	17	302.28	15,243,700	19,094,500	(a)
1914	11	181.26	26,239,700	44,094,241	(a)
1915	19	308.31	30,508,817	16,759,997	(a)
1916	19	430.14	13,895,400	22,702,300	(a)
1917	26	745.19	27,281,900	27,313,045	(a)
1918	23	524.22	37,740,325	20,149,384	(a)
1919	28	2,625.48	83,893,400	75.736,738	$42,300

(a) Not available.

All Companies not affected alike

In the face of such conditions utilities could follow one of two courses; which course was pursued would depend chiefly on their financial condition and outlook. A company which was in such bad condition financially that it could not hope to bring about any material improvement of its condition by increased operating efficiencies would probably abandon hope, carry on as best it could while waiting such action as the slow course of events might bring about, perhaps even hoping that municipal ownership would be so energetically pushed as to make possible the disposing of its investment at a fair valuation. It is of course difficult to state quantitatively the effect of the tendency here referred to; viewed in the present the result was probably a general relaxation of interest and discipline and a tendency to get along with as little maintenance as possible, while giving no thought at all to additions or betterments.[1] Viewed in a broader way the result was probably more serious than it seemed on the surface, for a broken morale and a run down condition of plant are diseases from which it is difficult to recover.

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[1] *Electric Railway Journal*, January 3, 1920, p. 57. There were, in addition, fourteen companies with one hundred and twenty-four miles of track which discontinued operation, and about fifty companies which abandoned parts of their line, amounting to about two hundred and sixty miles of track.

In the case of properties whose general outlook was not so hopeless a somewhat different policy was followed. Here hard times could be met, at least partially, by the conservation of every ounce of strength and vitality. Hence much attention was paid to operating economies and labor- and time-saving improvements whose use would long have been postponed had not conditions become critical so suddenly.

In the case of electric railways there may be mentioned as instances the introduction of "skip-stops" (partly attributable also to the United States Fuel Administration's coal conservation policy), the adoption of the light weight, cheaply operated one-man "safety car," of coasting recorders and meters to stimulate the saving of electricity, the use of fare collection boxes, and many like improvements. In the telephone industry the automatic exchange became of more importance. The more careful metering of electricity, gas, and water was introduced as were many other sources of small but important economies.

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[1] A gas engineer who has visited plants in many parts of the country in the year immediately following the close of the war states that the gas industry was at that time fast consuming its investment through inability to attend to maintenance and depreciation. Such a state of affairs could not continue long without very disastrous results.

There was, then, a general taking up of slack in the case of this second class of utility. This result is in keeping with the evidence introduced at the conclusion of Chapter II.

Quite a different matter was the lowering of standards of service rendered, that is, of reducing the product delivered per unit of price received. Such a reduction of standards, which had become quite general of late, is of course simply a means of adding to income through the reduction of expenses. In some cases this reduction of standards was effected with the consent of the consumers, as in the case of some interurban electric railways which have run fewer cars and in other ways have reduced expenses when it was impossible to keep their lines running otherwise. More often, however, it was done without the consent or knowledge and often against the wishes of the customers. Such matters are mentioned here solely because they have a bearing on the efficiency with which utilities are operated. In the gas industry, for example, there is a very interesting economic and engineering problem involved in the determination of the proper heating value standard. The question becomes one of efficiency in both production and consumption. English gas is of much lower heating value than American, and American gas companies are exceedingly anxious to secure a general reduction in the legal requirements. Such a movement should be encouraged, but the people should be protected through a careful determination in each individual case of the proper rate to be charged for the lower quality gas.

Difficulties of obtaining New Capital

It will perhaps be unnecessary to speak of the effect of changes in the investment market after the foregoing discussion of changes in the price level since the two sets of conditions are very intimately related. Increased operating ratios, reduced net income, lower dividend payments and delayed interest requirements have greatly depressed utility securities. Some of the public utilities are practically shut out of the investment market and others can secure funds for the improvements and extensions which are so badly needed only at very high costs. Babson has estimated that electric railway stocks have declined seventy-five per cent and bonds twenty-five per cent in value in the last ten, especially the last five, years.[1] This decline is strikingly attested to by statements by F. H. Sisson before the Federal Electric Railways Commission.[2]

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[1] Testimony before Federal Electric Railways Commission, *Electric Railway Journal*, August 16, 1919.

[2] The table he introduced in evidence, slightly altered, follows:

Security	Maturity	Price July, 1909, to yield	Price July, 1919, to yield
Detroit United Ry. first consolidated 4½'s.......	1932	5.90	7.55
New Orleans Ry. & Light cons. 4½'s............	1935	5.48	9.64
United Rys. of St. Louis first 4's..............	1934	5.01	[1]9.98
Chicago City Rys. 5's......................	1927	4.68	9.75
Metropolitan West Side Elevated first 4's.......	1938	4.68	9.40
South Side Elevated 4½'s....................	1924	4.95	9.71
West End Ry. debenture 4's	1932	3.84	6.00
Philadelphia Rapid Transit collateral trust 5's...	1957	4.85	5.85
Aurora, Elgin & Chicago first 5's..............	1941	4.94	9.30
Chicago Ry. first 5's.......................	1927	4.90	9.80
Duluth Street Ry. first 5's..................	1930	5.00	7.82
Los Angeles first 5's.......................	1938	4.68	6.42
Louisville Ry. consolidated mortgage 5's........	1930	4.45	5.74
Denver City Tramway first and refunding 5's...	1933	5.22	13.25
Brooklyn Rapid Transit consolidated 5's........	1945	4.60	8.40
Brooklyn Rapid Transit first refunding consolidated 4's..............................	2002	4.63	[2]8.70
Connecticut Ry. & Light first and refunding 4½'s	1951	4.40	5.95
Interborough Rapid Transit first and refunding 5's..................................	1966	5.05	6.95
American Tobacco Company 4's...............	1951	5.15	5.30
American Tobacco Company 6's...............	1944	5.25	5.15
Bethlehem Steel first extension sinking fund 5's..	1926	6.05	5.60
United States Steel sinking fund 5's............	1963	4.70	4.95
Virginia-Carolina Chemical 5's.................	1923	5.15	5.65

[1] Interest delayed.

[2] Stock yield.

(*Electric Railway Journal*, July 26, 1919, p. 179.)

The increase in the yield of the foregoing public utility bonds ranges from 21 to 154 per cent and in two thirds of the cases cited exceeds 50 per cent.

Conditions have improved, of course, over what they were in 1918, and they never were so desperately bad for other utilities as they were for the traction companies. Fare and rate increases have begun to yield increased revenues, further operating economies have been introduced, and operating ratios have declined somewhat.[1] But conditions are still decidedly unfavorable and render out of the question any plans for extensive rehabilitation and development.

The result of such a situation is the perfectly natural one that conditions which make for inefficiency are continued and accentuated and that utilities are unable to avail themselves of means that would raise their efficiency and put them on a sounder financial and operating basis. Conditions are especially bad at this time because of the large amount of construction work which was neglected during the war period, partly for financial reasons and partly because of the government's policy, and which needs now to be caught up.[2]

Just a word may be said about one other matter which suggests itself in this connection. It need not be dwelt upon at length because it is a phenomenon common to all types of industry. The war has elevated the position of

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[1]

	1914	1915	1916	1917	1918	1919	[1] 1920	[1] 1921
Operating ratio.......	60.51	65.09	65.00	69.82	73.28	74.64	78.4	75.2
Ratio net income to operating revenue...	19.6	13.4	17.0	6.57	4.44	4.8	4.49	6.17

[1] Ten months ending October 31.

(*Aera*, May, 1920, p. 1122, February, 1922, 608–609.)

These statistics are not exactly comparable from year to year, [illegible] the number of companies reported on varies considerably. Nevertheless they show certain unmistakable tendencies, and, in fact, may be said to under- rather than overstate these tendencies, inasmuch as the smaller companies are not included.

[2] D. F. Wilcox placed the nominal investment in public utilities at $12,000,000,000 in 1916, representing an average annual increase from 1906 to 1916 of $500,000,000. (*Annals of American Academy of Political and Social Sciences*, November, 1916, pp. 1–9.) This latter figure should be multiplied several times to obtain a figure which would represent the present needs of the utilities for investment funds.

labor and given it a larger voice in the management of industry than it had hitherto possessed. What effect on management this tendency will have cannot be predicted, but undoubtedly it can be made a helpful one. In so far as it works against concentration of authority and responsibility, however, from the somewhat restricted efficiency point of view it may be harmful. Thus in Wisconsin legislation has recently been passed which requires the Railroad Commission to grant increases in rates to utilities whose return on investment is jeopardized by the wage allowances of the State Board of Conciliation.[1] The effect of such legislation would seem to be to weaken the hold of the individual management upon its affairs and to produce an attitude of indifference to matters which previously had been forcefully contested.

Discussion of the foregoing subject has nearly completed our analysis of the factors which, individually and collectively, either explain the conditions which are set forth in Chapter II or give evidence of tendencies which have accentuated the causes herein analyzed. It can reasonably be said that these conditions are all serious and yet to a measurable extent remediable. Just what these remedies are or should be it will be our purpose in the remaining chapters to show.[2]

Service-at-Cost

The preceding analysis has been made on the supposition that utility management is in all particulars as it generally is known to be, with no marked departure from the general business principle of the assumption of all burdens on the expectation of receiving all earnings which can be made within the present system of utility regulation. It is necessary now to qualify this supposition somewhat in order to bring it into accord with certain developments, more or less recent, which display the problem here under consideration in clearer relief and show the need for its solution to be the more urgent. The tendencies to which reference is here made are principally two in kind and may be grouped under the heads of service-at-cost and subsidies.

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[1] *Electric Railway Journal*, November 15, 1919, pp. 891–95.

[2] Chapter IV furnishes an analytical basis for the succeeding chapters.

Service-at-cost is a curious phrase. How far it is something new and how far not will be seen in Chapter V. It is mentioned at this point because it is a developing idea and one which carries with it singular dangers. In essence service-at-cost is a method of regulation whereby the utility gives up all claim to speculative profits and is "assured" [1] in turn a fair return on the fair value of its property. This assurance can be made possible only by the automatic variation of rates or fares with variations in expenses. Its two essentials are, therefore, an assured and limited return and a flexible scale of rates. So far it has been applied principally to electric railways and indeed it may be said to be the product of that industry. But its principles are just as applicable to other classes of utilities and it would not be improper, perhaps, to predict that should other utilities find themselves in similar straits they, too, would be glad to take up more generally with such a protective device as this is proving to be.

From the present point of view it is the former of these two essentials which gives us concern. By taking the utility business off of a speculative basis and by assuring the receiving of a return regardless of the amount of effort put forth by the management, a condition is created in which it is humanly impossible not to expect some tendency to slacken one's efforts and to let the public bear the burden of diminished efficiency. This evil is a very real one and is being recognized as such by the utilities themselves. While so little time has elapsed since service-at-cost has become general that it is impossible to present any statistical evidence of its effects, we must bear in mind the natural consequences of this changed relationship and endeavor to learn what can be done to overcome any tendency to foster inefficiency. Certain more or less promising steps in this direction are being taken, as will be explained later.

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[1] This somewhat ambiguous term is discussed at length in Chapter V.

Public Subsidies

Public subsidization of utilities in the sense in which the term is here used is a new and strange development. The New York subways (with the exception of the original one) were publicly built, largely because private capital was not available or willing to undertake so vast and costly an enterprise. Likewise, the Boston subways were built by public means for reasons which were less strictly financial and perhaps more social in character. More recently there has been a considerable amount of discussion of the advisability of public ownership of the track which street railways use. Here the purpose is again largely financial, since such suggestions did not arise until it was realized that the electric railways were in an unsound financial condition and needed all possible relief from burdens if they were to function fully as the one chief local transportation agency.[1]

It is not, however, to subsidies of this kind that attention is here directed, but to subsidies as direct grants made from public funds to private corporations as a means of piecing out or adding to their operating income. The theory upon which such grants are based is ably and forcibly expressed in the following quotation from the Sixth Annual Report of the Massachusetts Public Service Commission, 1918, part I, p. xxv:

> If street railways are a public necessity, like the highways, the schools and the drainage system — and they clearly are —

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[1] See, for example, statement by Colonel Kutz, of the Public Utilities Commission of the District of Columbia, *Electric Railway Journal*, August 16, 1919.

street railway fares may be regarded as a form of taxation. In other words, it is now the policy to levy the cost of this public service upon the car riders alone through the fares which they pay, rather than upon the community as a whole through general taxation. Precisely the same principle might be followed in other cases. For example, a road tax might be levied upon vehicles in proportion to the size and mileage operated, or a school tax upon families in proportion to children in attendance; but it has come to be settled practice and belief that it is in the public interest not to assess the cost of these enterprises in such a manner, but to allow it to be borne by the community.

There is no inherent reason why street railway service should not be regarded in the same light and treated in a similar way. If the streets are a benefit to the man who owns no vehicle, or the schools to the man who has no children, so are the street railways to the citizen who never uses them. The problem is really one of taxation, to be dealt with, not in accordance with mere custom or tradition, but in the manner which will produce the best results for Massachusetts. If the greatest good to the greatest number can be secured by continuing — in theory at least — to place the entire burden of the cost of street railway service upon car riders, objections are not in order; but, if this is not the case, the Commonwealth ought not to be deterred by mere prejudices or conservatism from following a different course.

Legislation has been enacted in Massachusetts whereby any deficit incurred by certain electric railways may be levied against the towns served in proportion to the traffic respectively originating in them.[1] Besides this one concrete instance there has been general advocacy by certain of the electric railway interests of such a policy.[1]

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[1] The following provision is applicable to the Boston Elevated Railway Company: "If, as of the last day of June in the year nineteen hundred and nineteen, or the last day of any December or June thereafter, the amount remaining in the reserve fund shall be insufficient to meet the deficiency mentioned in section nine, it shall be the duty of the trustees to notify the treasurer and receiver general of the commonwealth of the amount of such deficiency, less the amount, if any, in the reserve fund applicable thereto, and the commonwealth shall thereupon pay over to the company the amount so ascertained. Pending such payment it shall be the duty of the trustees to borrow such amount of money as may be necessary to enable them to make all payments, including dividend payments, as they become due. If, as of the last day of any June or December thereafter during the period of public operation, the reserve fund shall exceed the amount originally established, the trustees shall apply the excess, so far as neces-

It is not difficult to show that the granting of such subsidies shifts the entire responsibility for successful and economical management from the utilities to the public. In Massachusetts, in fact, boards of public trustees have been created to manage the roads affected by the statute providing subsidies. The burden of inefficiency and laxity is fastened upon the public unless there be some effective preventive methods evolved. Just what these methods are or may be will be seen later. The only purpose in calling attention to this and the similar tendency under service-at-cost regulation has been to show how the forces which were already making for inefficiency in public utility operation are now being accentuated by these two recent tendencies. While these latter may be helpful as a partial solution of pressing problems of the day, their adoption even for this purpose cannot be justified if in the long run they will lower our efficiency standards or cause a stagnant prolongation of present methods of successful operation.[2]

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sary, to reimbursing the commonwealth for any amounts which it may have paid to the company under the provisions hereof, and the commonwealth shall thereupon distribute the amount so received among the cities and towns in which the company operates, in proportion to the amounts which they have respectively been assessed as provided in section fourteen." A similar provision is found in the case of the Bay State Street Railway. (See Special Acts, 1918, ch. 188, sec. 10; Sp. Acts, ch. 159, sec. 11.)

[1] A form of indirect subsidy is the granting of relief from taxation. This has been even more generally advocated by the utilities than direct subsidies. New Hampshire enacted legislation in 1919 allowing tax exemption to companies unable to pay operating expenses, repairs, maintenance, depreciation, and taxes. At least five of the fifteen roads of the state have applied for relief. For text of law see *Aera*, July, 1919, p. 1243. See also testimony of Bullock before Federal Electric Railways Commission, *Aera*, August, 1919, pp. 60–64.

[2] Interesting sociological and political questions arise in connection with subsidies. If generally adopted will they work against concentration of population and should they be adopted in fact just to prevent such concentration as now exists? Is the provision of local transportation a public

Expansion of Concept of Public Utility

Before leaving this topic attention should be called to a related phenomenon which contributes new difficulties and interests to the problem under consideration, *viz.*, the tendency to expand the content of the term public utility. In so far as that content is broadened our problem becomes the more far reaching and important. Indeed, whether it shall be broadened or not depends in some degree on the solutions which such studies as this should suggest.

It is difficult for any one to judge with full knowledge of the various tendencies toward collective activity which the war initiated. While the particular forms which that activity took are now rapidly disappearing and perhaps will totally disappear in time, yet the fact that so much was done and so ably done during that brief period by united effort cannot but have a lasting influence on our political ideas and institutions. We were rendered accustomed to regulation; we grew to realize our absolute dependence on certain agencies and we thereby erected in our minds the conception that such agencies, be they means of fuel or food production or what not, are so "affected with a public interest" that the latter was seen to be paramount and private profit a conscionable thing only in so far as it was held within fair limits. The result has been to broaden our conception of what constituted public welfare and of what agencies are essential thereto.[1] While it is not possible

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function? Some students of public utility problems, as Dr. D. F. Wilcox, have thought it possible that local transportation will, in the future, develop along the line of free service. Lynn, Massachusetts, is reported to have asked permission from the state legislature to provide transportation entirely paid for from the tax income of the city (*Minnesota Municipalities*, October, 1919, p. 143). That there is somewhat less enthusiasm for subsidies among electric railway men now than there was a short time ago is probably accounted for partly by the growing realization that they are an entering wedge to public ownership and partly to the betterment of the utilities' financial condition.

[1] The following quotation from the Kansas Statute creating the Kansas

to state that there have as yet been any permanent additions to the conventional list of public utilities, it is felt that that intangible thing, public opinion, has partially prepared itself for the day when many production and distribution agencies which are now considered to be sufficiently competitive to protect the public against abuse will be seen to be so fraught with dangers and so in need of constraint that the legal principles which now govern the activities of the regularly denominated public utilities will be extended to them.[1]

Court of Industrial Relations is thought to be uncommonly significant: Sec. 3. (a) "The operation of the following named and indicated employments, industries, public utilities and common carriers is hereby determined and declared to be affected with a public interest and therefore subject to supervision by the state as herein provided for the purpose of preserving the public peace, protecting the public health, preventing industrial strife, disorder and waste, and securing regular and orderly conduct of the businesses directly affecting the living conditions of the people of this state and in the promotion of the general welfare, to wit: (1) The manufacture or preparation of food products whereby, in any stage of the process, substances are being converted, either partially or wholly, from their natural state to a condition to be used as food for human beings; (2) The manufacture of clothing and all manner of wearing apparel in common use by the people of this state whereby, in any stage or process, natural products are being converted, either partially or wholly, from their natural state to a condition to be used as such clothing and wearing apparel; (3) The mining or production of any substance or material in common use as fuel either for domestic, manufacturing, or transportation purposes; (4) The transportation of all food products and articles or substances entering into wearing apparel, or fuel, as aforesaid, from the place where produced to the place of manufacture or consumption; (5) All public utilities as defined by section 8329, and all common carriers as defined by section 8330 of the General Statutes of Kansas of 1915." For a recent decision under this act see Re Flour-Milling Industry, P.U.R., 1921A, 795.

Further evidence of the expansion of the concept of what constitutes a public utility is found in the "rent commission acts," such as that enacted by Congress for the District of Columbia. This act has withstood repeated attacks and has recently (1922) been renewed for a period of two years. The decisions under this act differ in no way from the usual public utility decision, involving the same questions of investment or valuation, normal operating costs and a fair rate of return.

[1] Cf. Haney, L. H., "Price-Fixing in a Competitive Industry, a Pioneer Case," *American Economic Review*, vol. IX, pp. 425 ff., March, 1919.

Bearing of Public Ownership

From this subject one naturally passes to a related one, *viz.*, to what extent is municipal or public ownership a factor of increasing importance and how does it bear on the present subject?

Public ownership is a factor of like kind to the one preceding, but of a higher order of magnitude. It is the final step leading back through regulated private ownership to unregulated private ownership. Here again no predictions of a dependable character can be made, but a careful sensing of the situation seems to give evidence of a tendency for society, with a fuller knowledge of itself, to expand its activities.

In the face of such a force it is not possible for the privately owned utilities to go untouched. It is perhaps well that this ever-present criticism of private ownership should exist, for it puts the private interests on their mettle to show results which are better than those which are obtainable under public ownership and operation. Thus in England such comparisons can be made on a large scale and exert a stimulating influence on the privately owned utility. Comparisons originating from either side are constantly being made in the United States, and although these rarely if ever get down to fundamentals and show the true state of affairs, they do give a fighting zest to both sides.[1]

But should it at all be felt that the fight against nationalization or municipalization is a losing one, then there will be little of good left in the situation and it will be best to get on to the new basis as quickly as possible. For to continue a losing fight is wasteful with all the zest and energy gone out of it.[1]

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[1] For a scholarly treatise on this subject see Dr. E. E. Lincoln's *The Results of Municipal Electric Lighting in Massachusetts;* for a partisan treatment see any number of *Public Service Magazine*, Chicago. The Ontario Hydro-electric Power Commission is at present being appealed to, by the one side as a large success, by the other as a spectacular failure.

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[1] It is interesting to note yet another angle of this matter, *viz.*, the extent to which municipalization was recently courted by some of the utility interests, especially the electric railways, as a way out of their crippled financial conditions. At its October, 1918, meeting a resolution was passed by the American Electric Railway Association recommending that member companies "facilitate in every reasonable way the public acquisition of the present electric railway properties, arranging such terms of payment as conveniently accord with the financial limitations of the present laws of the respective states or municipalities; and that they assist in the promotion of such enabling legislation as may be deemed necessary by the public authorities to bring about the fullest measure of public ownership of electric railways and their future expansion to fully meet the needs of their respective communities." (*Aera*, November, 1918, pp. 371–72.)

This resolution was referred to the executive committee of the Association "for such action as it may determine to take upon it." How far this represents a genuine attitude on the part of the industry it is not possible to say. Such an unusual attitude, if genuine, is to be explained only as the product of extreme fear of the greater loss which seemed inevitable in many cases were private operation to continue. With the return of somewhat more encouraging conditions there has been a decided relaxation of this attitude on the part of the utilities in question.

CHAPTER IV

ASPECTS OF THE PROBLEM OF MANAGEMENT

In the chapters preceding an effort has been made to demonstrate that much inefficiency exists in the management of public utilities, to account for this condition, and to describe certain recent developments which accentuate what may be termed an inherent tendency for public utility operation to achieve less and less of a full measure of adequate performance. Before taking up a consideration of the remedies for this situation, so far as there are remedies, it will be well to obtain a clear understanding, first, of the general character of the problems of management; second, of the classes of individual to whom we must look for the promotion of efficiency in utility management; and third, of the motives to which each class is subject and through which any appeal for a greater interest in efficiency must be transmitted.

The Problems of Management

There may be said to be more or less distinct periods in the history of any business undertaking. The first of these is the promotion period, during which the project is conceived and takes on physical embodiment. The conception of the project is, of course, the most difficult problem which has to be solved, and, as some one has said, constitutes "pure management." It resolves itself into a determination of the possibility of capitalizing a public want. The existing facilities for satisfying this want, the expense of creating a new agency to satisfy it, the availability of funds for investment, the likelihood of permanent success — all these and other considerations must be carefully taken into account. It is particularly important in the case of public utilities that the project be assured of success, for investments in such industries are specialized to an uncommon degree and are almost entirely irretrievable if success does not come. In the case of a public utility a franchise must be obtained and, more recently, in many jurisdictions a certificate of public convenience and necessity, issued by the state commission, as well. To obtain the franchise a special and unique type of ability is required. In this early period the financial framework is erected, a problem involving questions of the kinds of securities to be issued and the proper proportions to be maintained between them, and of their flotation. Continued control must also be assured.

The second period might be likened to what the biologists term the "maturation period," or the period during which maturity is reached. During this period the weaknesses of the plan are revealed and steps are taken to overcome them. Self-restraint in the matter of taking earnings out of the business must be exercised. Reorganizations may take place and oftentimes the stockholders are compelled to put additional funds into the enterprise to make its continuation possible. Sales must be built up and a well-coördinated operating force must be collected and developed. Solidification in every phase of the organization must take place. It is principally during this period that "going value" is created.

The third, and, for present purposes, the last and most significant period is that which begins with the attainment of relative maturity. Progress and larger developments are still possible and in fact highly necessary, but the conception of new ideas and radical departures from established practices is relatively less important than the day to day management of the affairs of the undertaking. The problems of management encountered in this period may be said to be of four types: those relating to financial policy, general policy, return and costs.

The problems of financial policy involve such matters as changes in the form and amount of capitalization and the disposition of earnings. At one time in the history of the utilities of this country there was considerable latitude allowed the companies in the matter of disposition of earnings. Thus some companies built up large property holdings out of earnings, while others paid out in dividends all of their earnings and not infrequently a part of their capital as well. At the present time there is still some choice, to be sure, particularly as companies often try to maintain a dividend rate which earnings do not warrant, but both the theory of regulation and the practice of it require that all additions and betterments be paid for out of new investments of capital.[1] Certainly there is little opportunity at the present time and even less incentive to build up property out of earnings.

Questions of general policy involve such important matters as the advisability of merging or consolidating with or the leasing of the properties of other companies, the extension of facilities into new areas, or the adoption of some fundamental change in method of operation, such as the adoption of the automatic telephone in place of the manually operated telephone, or the adoption of bus operation as supplementary to street railway operation — changes which would involve a considerable making over of and addition to the present plant.

Turning now to the question of return, obviously, from the company's point of view, the problem here is that of securing the maximum return possible. This, in turn, involves (a) sales and (b) rates. Sales must be highly developed and maintained, a task involving an energetic and well-balanced and far-seeing new business policy and tactful relations with the public. Rates must be kept at the optimum, that is, at that point which will be most favorable to the development of sales and revenue, and yet be so adjusted as to promote an amicable relation with the public and to prevent the machinations of politicians. The utility must be particularly careful during the critical periods of franchise renewal or rate regulation. In fact, regulation is an overshadowing cloud whose presence may never be forgotten.

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[1] It is not intended, of course, to convey the meaning that such expenditures are in the first instance necessarily paid from the proceeds of the sale of securities, but that expenditures made from reserves and from borrowings on short-term obligations are reimbursed by the injection of [redacted] capital from outside sources.

Finally, costs must be kept as low as possible, or, stated in another way, the problem here becomes one of making the most efficient use of the resources which are put at the disposal of those in charge of the utility. To accomplish this end requires, in turn, buying and hiring and using to the best possible advantage. Buying involves a good commercial sense and the ability to purchase to advantage. Hiring involves a knowledge of human traits, the selection of the better types of employees and the elimination of the less desirable types. Using either material or labor to advantage involves in the one case a knowledge of engineering and technical matters, and, on the other hand, a knowledge of men. It is becoming recognized more and more that no small part of the problem of management is the problem of securing and maintaining the best possible relationship with the labor element. The problem is somewhat peculiar in the case of public utilities by reason of the fact that the employees come into direct contact with the public in many instances, that the public interest is immediately and forcefully injected into any dispute between company and men which involves or threatens to involve a cessation of operations, and that in the case of certain classes of utility labor constitutes so large an element of expense. Matters of human economics or human engineering are as yet in their early development stage and therefore need much more attention than they have received in the past.

These, then, are some of the problems which are involved in the management of a public service corporation. This statement is admittedly incomplete and schematic and could be elaborated upon at length. It suffices, however, for our present needs.

Classes or Types of Persons engaged in the Management of Public Utilities

In what classes or types of persons does management rest and what are the motives which appeal to each? In answering these questions the simpler case, in which control is fairly well centered in a local group, is considered first; later, such variables as syndicate control introduces will be considered.

The management of public utilities differs from that of competitive types of industry principally in that it is less centralized. In competitive industry management is highly concentrated in the hands of a board of directors, as the representatives of the stockholders, or, more specifically, in the hands of that part of the board of directors which, through representing the controlling interest in the enterprise, is most active in the management, and in the so-called "manager." Theoretically, of course, the entire body of stockholders is the final source of all authority, but normally control is exercised on the representative principle. In case of financial difficulty special committees of the stockholders or bondholders may step in, as may outside creditors under special circumstances, and at such times there often is a change in the active management. While cases of such financial difficulty are so frequently met with as to be considered almost normal, the fact that during such upheavals there is an animated and concentrated interest in the affairs of the undertaking leaves little to be desired in the matter of the attention paid to its affairs by its officers. Economies, improvements, reassignment of duties — a general shakeup, in fact — put new life and zest in the undertaking. For this reason it is possible to limit the treatment here to more normal conditions.

Little need be said about the work of the directorate, since economic literature is well supplied with accounts of it. American directorates, while representing to a large extent the banking interests, are yet highly specialized and contribute to the enterprise experience gained in many fields of industry. It will be desirable, however, to dwell at some length on the manager, for he figures very prominently in the ensuing chapters of this essay.

Two Types of Manager

The word "manager" is a very difficult one to define accurately and precisely, since it covers what may be considered to be two fairly distinct types of individual. There may be said to be "entrepreneurial" managers and "non-entrepreneurial" managers.[1] Entrepreneurial managers are those individuals engaged in the active direction of the affairs of an enterprise who, through ownership of securities, are identified in interest and motives with the other members of the entrepreneurial class. Such individuals are not necessarily called "managers"; in fact, they are more commonly known by such other names as president, vice-president, etc. This class contains all of those individuals who, partly through control of credit and partly through personally owned capital, share in the direction of investments and actively engage in the management of industry. The control thus exercised is often only a slim, marginal one, the maintenance of which calls for constant exertion. Entrepreneurial managers are differentiated out from the general entrepreneurial class simply on the basis of the fact that they are in active control of an individual enterprise. This fact does not preclude them from being somewhat more passively engaged in the management of other enterprises in which other individuals have charge of the active management.

The non-entrepreneurial manager is a hired employee who is chosen by or under the direction of the board of directors to take active charge of the affairs of an undertaking.[1] While he may have a small proprietary interest in the undertaking, he is not considered to be one of the inner circle which controls its affairs and is not allowed, as is the entrepreneurial manager, to participate, except in an advisory capacity, in the formulation of the basic policies of the undertaking. This type of individual commonly comes from the ranks, if those persons who through advanced education or unusual ability are able to progress rapidly to the top are included. His interests and affiliations become identified more and more with the entrepreneurial class as he advances and entrance into that class becomes increasingly the goal ahead of him.[2]

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[1] It is unfortunate that there is not a simpler word which would render precisely the meaning of the word entrepreneur.

There have been many interesting developments of late in both the entrepreneurial and the non-entrepreneurial manager types. Management has come to be recognized more and more as a distinct factor in industry and to be in some respects a larger term than "entrepreneur" while in other respects a narrower one.[3] It is not possible, within the limits of this study, to go into this question in detail. The opinion may be advanced, however, that management of the non-entrepreneurial type will become increasingly important as industry becomes more complex and especially if the control of industry becomes more collectivistic than it is at present. In any event, management will become more of a distinctly recognized profession requiring special aptitudes and training. That managers are coming to be less and less masters of particular trades or lines of industry is evidence of this differentiation of their functions. This tendency has some harmful effects, no doubt, but it makes possible that specialization in purely managerial problems which is necessary to the attainment of the best results.[1]

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[1] It is, of course, difficult to draw a sharp line between managerial and non-managerial employees. In a sense the foreman or "ganger" is a manager. Management has become a highly differentiated and specialized function. It is assumed, however, that these lower forms of management work themselves out through, or are directed by, a manager (whatever his title) and that it is this manager in whom interest chiefly centers. He is, then, the official actively in charge who accounts to no higher authority other than the board of directors or some subdivision or representative of it.

[2] Mention may be made of the tendency in American industries to-day to encourage stock ownership by employees, especially by those occupying managerial positions.

[3] Thus the Wisconsin Railroad Commission said in the case of State Journal Printing Co. *v.* Madison Gas and Electric Co. (4 W.R.C. Reports, 642, 1910): "The managerial function of the employer (entrepreneur) would thus seem to be of a different nature from his function as a risk-taker." The functions of management in the public utility industry are most thoroughly considered in this case.

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[1] The following quotation from the Interim Report of the European Commission of the National Industrial Conference Board, dated July, 1919, may be said to be a portrait of the non-entrepreneurial manager painted by himself:

"The industrial manager is not a product of books or education. He is born, not made. Training and education will add to his intelligence and power, but his bent is intrinsic. He is found only by being tried out in actual experience. . . . The manager is the pivot of success for any concern. He is the most important person in the life of industry. He it is who makes employment possible for a labor force of thousands; and yet he is almost always a salaried man. . . . It becomes obvious, then, that a manager is a man paid for certain very necessary services to industry. He is not paid for the possession of capital. . . . A manager is a member of the laboring classes, only he is distinguished by being a highly skilled laborer. . . . Moreover, the wages of the manager are determined on the same principle as that of any skilled labor. . . . A highly paid manager is often the cheapest man to his company."

If further substantiation of the correctness of the distinction made between the entrepreneurial and the non-entrepreneurial manager is needed, the following quotation amply supplies it.

". . . The individuals responsible for the active management of the (electric railway) business, and upon whose devotion, enthusiasm, and ability, the successful results of that management must always largely depend, will seek other employment promising better appreciation and reward for their efforts. They are not tied to this business as are the investors. Not only need they make no further contribution of their vitality and ability to a business refusing to recognize what they do, but they may withdraw all the valuable features, business experience and executive ability, of their past contribution and dispose of them elsewhere. Attention has already been called to the loss of personnel in the Boston Elevated which may have been merely a coincidence, but may also indicate such a tendency as might be expected to occur among active men finding that they are connected with a water-logged enterprise.

"Private capital and private enterprise can neither be permanently retained, nor can additional capital absolutely necessary to success be

Normally, control does not pass out of the hands of the directorate and the manager. Reference was made in Chapter III to the tendency for labor to demand a greater participation in the management of industry, but the view was there expressed that such participation will not extend beyond matters in which the labor element is directly concerned, such as working conditions, hours of labor, terms and forms of remuneration. While these are important matters, in their determination ordinary economic laws cannot be overstepped and what can be demanded or granted in any establishment will be limited by what that establishment and the industry of which it is a part can afford. There will be a tendency, then, for conditions to be equalized between industrial establishments with the result that their competition one with another will not be based on differential advantages gained in the remuneration of labor. In other words, the problems of management, while narrowed by this process, will not be thrown open for the determination of the general body of employees of any establishment.

Other Factors in Management

The only other controlling influences are the law and competition. The law puts certain limitations on the freedom of the management, but since these apply equally to each individual undertaking engaged in an industry

obtained, unless the reward received is sufficient to attract the initiative of investors and managers essential to the development of the industry — and to attract that initiative in competition with all other industries seeking that same capital and that same managerial ability." (From Report of Committee of One Hundred to the Federal Electric Railways Commission, *Aera*, November, 1919, p. 526.)

The late Theodore N. Vail is an almost perfect example of the managerial type. Taken into the Bell Company because of his remarkable powers of organization, as demonstrated in his service in the post office department, he rapidly brought order out of the chaotic beginnings of the telephone industry and put that industry on a national basis. As has been said, "Bell invented the telephone; Vail the telephone business." See Paine, A. B., *In One Man's Life; being Chapters from the Personal and Business Career of Theodore N. Vail*, 1921.

they represent a constant factor which requires no special consideration. Competition also places certain limitations in the way of management, in the manner set forth in the preceding chapter. There are other of these general conditions, such as trade customs and the control exercised by the monopoly buyer, which place restrictions on the freedom of management, but none of them impinges on the management to the extent that regulation does in the case of public utilities.

As stated at the outset, the management of public utilities differs from that of competitive or non-regulated industries chiefly in that it is less centralized. The factor which introduces the decentralization, public control or regulation, has been analyzed at length in Chapter III and requires no special comment here. Through control of capitalization, accounting, rates, service and return, and even in some cases through prescribing conditions which are thought to conduce to efficiency and through mapping out a commercial policy, regulation is an altogether real and vital factor in the management of public utilities. Regulation adds, therefore, a third factor to the directorate and the manager, rendering the management of public utilities tri-lateral. In speaking of regulation here it is state regulation which is principally in mind. Such regulation is coming to be more and more coöperative and to work along side by side with the private agencies of management, whereas municipal regulation, as it is generally known to-day, is more apt to be of a combative nature and to represent therefore more an external force which must be overcome than an agency with which management is shared. Certain new forms of local regulation which service-at-cost has introduced partake more of the nature of state regulation, as is pointed out in the following chapter.

Differentiation of Functions of Two Types of Manager

Reverting to the analysis of the problems whose solution constitutes the function of management, one can readily perceive which ones come within the province of the entrepreneurial managerial group and which ones within the province of the non-entrepreneurial manager. The former group deals with all questions involving matters of broad policy — the large financial problems, important changes in the policy of the company, such as the adoption of a new method of production, broad questions of rates and service, and the like. It is advised and actively guided by the first-hand experience of the active manager and is especially subject to his persuasion if he is himself a large owner of the company's securities. The less general and formulative but none the less important and compelling matters fall more particularly within the purview of the manager *per se* as distinct from the entrepreneurial managerial group. He reports and is strictly accountable to the owning or controlling group and depends entirely for support upon it. If he fails to receive its continued support and confidence he is at once subject to displacement, provided, in the case of the entrepreneurial manager, his proprietary interest in the undertaking does not make it possible for him to retain active management. The special function of such a manager is the active, day to day direction of the affairs of the organization. He is in daily contact with the undertaking's operations, receives reports from a number of chief subordinates and from these and personal observation maintains a watchful, constructive supervision of its affairs. He is looked to for the final determination of all matters which fall within his range of power. He looks to sales, engineering developments and improvements, hires many of his own chief subordinates and is responsible for the hiring of the rank and file of the employees. He builds up and maintains a working organization.

It is not proper, however, to speak as if there were one distinct type of public utility, and in fact it has frequently been indicated that such is not the case. What variations do size and the character of the ownership and control introduce?

While there are probably no material differences in the relative importance which the various factors in management possess in a small utility serving a small place on the one hand and in a large utility serving a large district on the other, there is nevertheless in respect to all of them a lesser degree of expertness in the management personnel of the small utility. This difference is readily attributable to the inability of smaller undertakings to attract or retain men of large capacities and to their inability to use specialized ability to the extent that the large utility can. Some public utilities are exceedingly small.

Syndicate control may be said to introduce a real difference in the relative force with which the various factors in management play on the situation. Here control of a number of utilities is more highly centralized, and the management of a single utility is more specialized and more expert. This is true of both the entrepreneurial and the non-entrepreneurial management. The board of directors of a syndicate utility, while consisting in part of local men, is made up in such a manner as to leave no doubt as to where the actual control rests. The men who represent the syndicate interests on the board of directors are themselves large entrepreneurs with broad, highly developed business experience, or else special representatives of them, men who themselves are highly trained and highly specialized experts. The board of directors is in turn advised by a number of kinds of specialists, some dealing principally with financial, others with franchise and legal problems, others with engineering and technical problems, and still others with labor and personnel problems. The manager of the local utility is himself a product of the syndicate's schooling and represents its general policy in all particulars. His more important decisions are made for him at "headquarters"; such decisions as he himself makes are subject to the *visé* of headquarters. In fact, a very important result of syndicate control is its tendency to displace the entrepreneurial manager and to replace him with a non-entrepreneurial manager. This tendency is similar to that which has shown itself for a number of years in the grocery and drug businesses, where the syndicate or "chain" stores supplant the small independent entrepreneur with a hired manager. The result of this movement will be referred to further in Chapter VII.

The Motives of Management

An elaborate and refined analysis of the motives of management would be out of place in this essay. Rather should it be the aim to limit the discussion to the minimum of motives which are needed in the treatment of the problems with which we are here dealing. In no other way can these problems be made real and their solution be rendered as easy as possible.

First of all, it is possible to dismiss the bondholders and labor. The bondholders receive a contractual income which tends to approximate the current rate of interest. As bondholders, the safety of the investment and the regularity of the return are the sole desiderata.[1] Labor may be

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[1] How large a part of the total capitalization of the utilities is thus removed from consideration is shown in the following table:

	Total capitalization	Stock		Funded debt	
		Amount	Per cent	Amount	Per cent
Central electric stations (a)......	$2,857,571,124	$1,560,251,265	55	$1,297,319,859	45
Electric railways (b)	5,532,223,818	2,473,846,651	45	3,058,377,167	55
Telephones (c).....	1,169,073,870	665,944,471	57	503,129,399	43

(a) Covers 2785 central electric stations. Census of Electrical Industries, Bureau of the Census, 1917: *Central Electric Light and Power Stations*, p. 103.
(b) *Ibid.*, *Electric Railways*, p. 52.
(c) *Ibid.*, *Telephones*, p. 30. Subject to certain adjustments for intercompany holdings.

It is possible to assume, then, that at least one half of the capitalization of the public utilities of the United States can be dealt with on a purely contractual basis.

dismissed, first, because of the narrow limits within which it can participate in management, and, second, because it is assumed in this essay that if the management sees fit to extend to the general body or any special class of employees methods of management which will result in added efficiency, the problem is one for the manager to solve. Our treatment does not reach down through all the strata of employees. By focusing attention on the manager and his motives substantially the same result will be accomplished and with fewer complications.

Our analysis is also limited to the active, controlling section of the stockholders, since the greater portion of the stockholders, numerically, are relatively indifferent or impotent when it comes to matters of management. If they function at all in this respect it is in times of financial emergency, as has been pointed out above.

The fact that the function of management is shared by the regulating agencies makes it necessary to consider the influences which bear upon and control their action. While these are perhaps not so largely economic in character as are those which are considered in treating the other two factors in management, they cannot be ignored and in fact those of them which are helpful need positive stimulation. These matters are considered in Chapters VI and VII.

What, then, are the motives which actuate the controlling body of stockholders and the so-called management? These clearly are fundamental considerations.

While there has been much discussion of motives in recent economic literature, this has been limited very largely to the motives of the employed workers and has rarely extended itself to the entrepreneurial or even to the higher grades of the employed class.[1] Whether this fact points to the conclusion that the latter class is already sufficiently and properly motivated cannot be stated. Such a conclusion, so far as competitive industry is concerned, is certain to be drawn from current business practice and philosophy. We shall, indeed, not attempt to go very far beyond the limits set down by orthodox economic analysis.

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[1] Important exceptions are the writings of Veblen, Marshall, Taussig, E. D. Jones and possibly a few others. Parker, Tead, Marot, and the whole school of "motive-psychologists" address themselves more to the prob-

The Pecuniary Motive.

The fundamental motive of the entrepreneurial managerial group is, obviously, the pecuniary one.[1] This motive should, however, be looked upon as proximate only and not as ultimate. In other words, the pecuniary motive is not an unmixed one, but rather a complex of motives. It is based not only on the love of wealth, of property, or the desire to accumulate and possess, but also upon such other motives as the satisfaction of personal vanity through luxurious expenditures on home and family and self and in other like ways, and on familial and paternal love showing itself in the desire to provide well and to leave an estate.[2] We need not pursue this analysis to its uttermost limits;

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lem of the great mass of minutely directed employees than to that of the business types here discussed and for that reason do not contribute directly to the solution of our problems.

[1] "The motive of business is pecuniary gain, the method is essentially purchase and sale. The aim and usual outcome is an accumulation of wealth. Men whose aim is not increase of possessions do not go into business, particularly not on an independent footing." (Veblen, T., *Theory of Business Enterprise*, p. 20.) Taussig (*Inventors and Money-Makers*, p. 40) says: "Now your business man is all for profit — just how and why, we shall consider presently."

[2] Thus Alfred Marshall says (*Principles of Economics*, 6th edition, p. 14): "[But, for all that] the steadiest motive to ordinary business work is the desire for the pay which is the material reward of work. The pay may be on its way to be spent selfishly or unselfishly, for noble or base ends; and here the variety of human nature comes into play. But the motive is supplied by a definite amount of money; and it is this definite and exact money measurement of the steadiest motives in business life which has enabled economics to outrun every other branch of the study of man."

for present purposes it is sufficient merely to suggest the complexity of the pecuniary motive.

Emulation or Personal Competition

There are also selfish or non-altruistic motives of a non-pecuniary character. These can perhaps be treated under the head of emulation or personal competition. Here the desire is to keep ahead of one's competitors in any of the ways which are currently acceptable. This motive relates more peculiarly to the "managers" of public utilities than to the members of the directorate for the reason that the latter "have their being" principally in other fields, such as general finance or in any of a great number of business or professional callings, and are not judged solely on their attainments in the utility field. It also is particularly applicable to the managers of syndicate utilities because of the large number of managers employed by them who are striving with one another to obtain the best posts which the parent company has to offer.

Desire to serve

There are also certain non-selfish or altruistic motives which call for some consideration. Thus the desire to serve one's day and generation and community cannot be entirely ignored. There is also the sense of duty and devotion. The desire to serve possesses different men in different degrees, depending partly on age — one must have a surplus before he can be altruistic and yet remain successful — partly on wealth, education, training, and business and social environment, but principally on the inherent nature of the individuals themselves. A great amount of stress need not be laid on this motive beyond thus indicating its general character; it may in fact safely be relegated to the background, since it is so inconstant and variable and so utterly lacking in many cases that it cannot be counted on to any great extent in our later analysis of means of stimulating efficiency. It should also be noted that the general welfare is promoted by the actions of individuals seeking selfish ends. This general assumption of economists and social philosophers is not, however, a motive itself, but an effect of other motives.

What, next, are the motives which are peculiar to the management as distinct from the directorate and the controlling interest in the directorate? Where the manager has a large financial stake in the company which he serves his interests are practically identified with those of the groups just named. They are perhaps amplified somewhat owing to the fact that he has not only wealth to lose through the failure or disability of the company but also his own good name. Let us pass on, then, to the other and more distinct type of case where the manager is essentially an "outsider" who is brought into the management of the affairs of the company because of personal and professional qualifications for the position.

Here is encountered a somewhat different set of conditions from that which characterizes the entrepreneurial group. The pecuniary motive is present in large measure, to be sure, and is never lost to sight. Whether it assumes the same large and dominating proportions that it does in the case of the entrepreneurial group depends altogether on the grade and type of individual one is considering. It is difficult to generalize on this subject, for there are many differences in responsibilities and remuneration of managers, and what is true of the upper grades may not be true of the lower ones, and *vice versa*. Where the remuneration is large a surplus can be accumulated and financial independence may gradually be attained. But where the remuneration is small and the collection of any considerable surplus is not possible, a very moderate degree of financial security rather than financial independence is looked forward to. This latter class is numerically the larger and the one which must be looked to, to a large extent, for the improvement of efficiencies. This conclusion is in keeping with the point which has been made repeatedly throughout this paper, that it is the smaller utility which stands in particular need of improvement. There is perhaps this line to be drawn between these two groups of non-entrepreneurial managers: in the group where the responsibilities and the financial remuneration are relatively large the manager is looking forward to an early entrance into the entrepreneurial group. His interests and affiliations are therefore principally with it. In the second group, where the responsibilities and remunerations are relatively small, the distance to be traversed before entrance into the entrepreneurial group can be gained is long and difficult and may be, in appearance and fact, effectually blocked. Here it would seem that the age and success of the individual manager would be a factor, since increasing age without attendant marked success would seem to cause more of an affiliation in interest with the upper grade of the general body of hired employees. That this does not take place as frequently as might be anticipated is to be attributed partly to the lasting influence of early education and personal ideals, and partly to the lasting powers of that human quality, hope.

But in speaking of the motives of managers as distinct from those of the controlling body of stockholders and the directorate, the motives in mind were more particularly those which arise out of the functions or duties of management. These may be roughly divided into those which have their seat of action respectively in professional zeal and in the seeking of social self-esteem.

Professional Zeal

As has been stated before, management is coming to be recognized as a profession with interests and traditions, laws and standards of its own. There is a managerial type quite distinct from the entrepreneurial.[1] Large industrial and utility undertakings, particularly the latter because of the scattered or decentralized character of their holdings, have for years carried on systematic, formal training of promising young men for managerial positions. And the managers themselves have their professional societies whereby are achieved an interchange of ideas and experiences and the development of professional spirit and standards. Thus the National Electric Light Association, the American Gas Association, the American Electric Railway Association and other like organizations are essentially managers' associations. The syndicates as well have meetings and publications addressed particularly to the higher grades of their managerial employees. What might be termed "entrepreneurial" associations in the electrical industry are, for example, the Electric Power Club, the Association of Edison Illuminating Companies and, possibly, in certain respects, the National Electric Light Association. These are of course "close corporations." In each of the utility fields there appear to exist these, or even less formal organizations, for the determination of large matters of policy of common interest.

Reference has been made to these organizations of managers principally to call attention to certain external evidences of the existence of professional zeal among utility managers and of an opportunity for the strengthening of this zeal.

Professional zeal is essentially the desire to excel in one's work. It is a thing quite apart from the pecuniary motive. It may at times override the latter and may to that extent prove, at least immediately, unprofitable. It shows itself in hard, energetic endeavor and in both routine matters, where quantity counts, and in matters involving creative or independent thinking and action, where quality counts. It is what most modern motive-economists call the "instinct of workmanship" or the "creative instinct" and what they try to instill into the directed worker to offset some of the stultifying and benumbing effects which routine and mass production produce. But while it is a thing to preach about and argue for in the case of these classes of workers, in the case of the managerial type it is already functioning to a large extent. The managerial group is a highly picked and sorted group; it represents the result of a long and trying process of elimination. The right combination of personal characteristics must be found; the absence of any one of them will be a source of such serious weakness as to result in ready elimination.

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[1] One sees additional evidence of this type in the increasing number of so-called "management corporations" or agencies, which hold out their services as managers of public utilities in return for stipulated fees. See also in this connection Sidney Webb's little volume, *The Works Manager Today.*

Seeking for Social Self-Esteem

By the seeking for social self-esteem is meant those promptings to action which a desire for personal satisfaction based upon a consciousness of standing well in the eyes of one's contemporaries and associates gives rise to. It is a very persuasive force and one whose influence few are free from. It also is a thing quite apart from the pecuniary motive. In competitive business, however, this motive is relatively weaker than it is in the field of public utilities for the reason that there is lacking that personal contact between producer and user, between act and consequence, which exists in the case of public utilities. The manager of a competitive business of any size sells chiefly to people whom he never sees; therefore neither they nor his business acquaintances can call up feelings which all too commonly beset the manager of a public utility. The latter knows that the public is a merciless critic. The general public appears to feel that to criticize is to discharge one of the duties of citizenship. The feeling that it is more or less at the mercy of a monopolistic agency also is back of much of this criticism. Public utility managers must, then, face an unforgiving and unrelenting public opinion if they are derelict, or if the public thinks they are derelict, in the performance of their duties.

The avoidance of public odium is, however, not the chief form which the desire for social self-esteem takes. It also takes the form of fear of failure, again on the negative side, and pride and ambition on the positive side. It is essentially the desire to be a conspicuous success and, as we have seen, the trying-out process is more excoriating in the case of managers of public utilities than in the case of managers of undertakings of like magnitude in the field of competitive industry.

Personal Qualities of the Good Manager

A few words further may be said about the necessary personal qualities of the good manager. The essential qualities needed are foresight, energy and progressiveness, tact and honesty. Without foresight the proper decision of those matters of policy which are left to the manager will not be possible; mistakes will be made whose cumulative effect will be felt as time goes on. Energy and progressiveness are needed to keep off that sloth which the relative security of the utility's position is apt to produce and that the manager may be abreast of the times and a leader in the introduction of new methods and a leader of his men. Tact is needed in order that the company's relations with the public and those with its employees may be amicable and wholesome. Honesty is needed as a fundamental, not only of real management of any sort, but especially in the case of public utilities as the only means of sustaining a proper attitude on the part of the people. Any show of dishonesty and insincerity, be it through political connivance, a financial policy which looks to the "milking" of the utility property, of financial manipulation in other forms, will at once destroy all possibility of wholesome relationships between utility and people.[1]

That the above traits are highly necessary has been recognized by the utilities themselves, especially by the larger ones, and by the syndicates. The proper human qualities are recognized as of as great importance as technical knowledge. The public utility manager is always a prominent citizen and he can do much harm or good by failure or ability to stand well with the people.[2]

Technical education and skill obviously are important

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[1] A new generation will have to arise, apparently, before the utilities will be able to throw off the burden of public disfavor which certain unsavory practices, indulged in in the past by a relatively few individuals, have called down upon the whole utility industry. This one condition, for which existing managements may be in no way responsible, may be in some communities the largest single obstacle which must be overcome before a rational solution of their utility problems will be possible.

[2] The following table presented before the Institution of Electrical Engineers of Great Britain, showing the faculties required for the different grades of tramway employees from manager down, is interesting. Material of this sort is so exceedingly rare that it may be quoted here. Most of the personal qualities spoken of above are found under the heading "administrative."

FACULTIES
(Percentages in all cases)

Grade	Financial	Commercial	Technical	Custodianship	Bookkeeping	Administrative
General manager	10	5	25	5	5	50
Chief engineer	2½	5	40	2½	5	45
Power station engineer	..	5	40	10	10	35
Assistant power station engineer	..	5	45	10	10	30
Charge shift engineer	..	2½	82½	5	5	5
Foreman	..	..	85	5	2	8
Traffic manager	5	10	10	15	15	45
Development superintendent	5	35	5	..	20	25
Operation superintendent	5	15	10	25	10	35
Divisional traffic superintendent	5	15	10	25	10	35
Permanent way engineer	5	10	35	10	5	35
Assistant permanent way engineer	5	5	30	20	5	35
Foreman	..	5	50	20	..	25

Electric Railway Journal, May 3, 1919, p. 859.

elements as well. Here again the small and non-syndicate utilities are at a disadvantage. The essential requirement for good management on this score is a breadth of training, for the duties of management range from highly technical work to work requiring financial and business and administrative ability.

An unfortunate result of the effect of specialized training is seen in the case of companies which combine different kinds of utility businesses, such as the electrical and gas business, in one undertaking. There inevitably is a tendency for one of the two to suffer and usually it is the gas end of the business. This condition is partly attributable to broader reasons, chiefly conscious financial or managerial policy, but it is due also to the mere fact that the manager in charge has been trained to know either the gas or the electric business and rarely to know both. He therefore neglects the one which he knows the less about, with the result that in many cases it gets into a deplorably run-down condition. Since such cases of combined service are exceedingly common in the United States it means that there is here a factor of prime importance.[1] And even in so far as the relative neglect of one end of the business is due to deliberate policy, it is to no less extent a very real cause of inefficiency and a factor which cannot be neglected.

Forms of Remuneration

In view of the preceding discussion of the classes of individuals engaged in the management of public utilities and of their motives, it will be well to go a step or two further and to make a few remarks about the forms of remuneration which they respectively receive.

The remuneration of the entrepreneurial class is principally and in fact characteristically, profits. Such profits may take any of a number of extremely varied forms, all of which need not be enumerated here. The form which is most obvious and in a sense most legitimate is the receiving of a return on a fair value of one's property in excess of the rate of pure interest. Of this form of profit much will be said later. Other forms of profit are less direct. The enhancement of the rate base or the valuation upon which return is computed is an important form. Where this is due to manipulation or chance or to the natural growth of business and of urban property values it may properly be termed a form of profit. Unduly high promoters' and underwriters' fees and commissions, stock bonuses and some forms of stock dividends, the padding of construction and equipment accounts by arbitrary valuations, the organization of dummy contracting companies and paying them excessively for the work they do and the material they furnish, the payment of excessive salaries, and of excessive rentals for property leased, are some other forms which profits take in the utility business.[1] It is not to be presumed from a reading of this list that profits are altogether an illegitimate thing, although regulation does tend to eliminate them. We shall see in Chapter VII, and in fact in Chapters V and VI as well, that properly controlled profits constitute an essential element in the public utility field. They should, however, take an unmistakable and unconcealed form.[1]

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[1] Thus, in New York State, outside of New York City, of the 115 class A companies furnishing gas or electric service in 1918, 39, or about one third, were engaged in furnishing both electricity and gas service. This tendency is much less marked, however, among the smaller companies.

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[1] The Wisconsin Railroad Commission in a number of decisions which are summarized here, thus looks upon profits: "Profits are now acknowledged to be a peculiar form of income which, while they differ from rent, wages, and interest, occupy about the same rank when it comes to their fundamental importance. Profits are a surplus over and above the expenses of production. They are usually identified as the balance left over after the claims of all other factors have been satisfied, and as the income that goes to those who carry on the business. Profits, being a surplus, are not determined by any one set of principles. They are the result of the many forces that affect the prices at which the products sell as well as the cost at which they are produced. In a general way, however, it can perhaps be said that profits are made up of the wages of management, of speculative gains from the risks which have to be assumed, and of gains, such as depend on chance rather than on foresight, and of gains due to power of bargaining and other conditions of this nature, including monopoly powers." Wisconsin R.C. Digest, p. 392; State Journal Printing Co. *et al.* *v.* Madison Gas & Electric Co., 1910, 4 R.C. 501, 636–37; *In re* Fond du Lac Water Co., 1910, 5 R.C. 482, 506; *In re* Manitowoc Water Works Co., 1911, 7 R.C. 71, 100; City of Milwaukee *v.* T. M. E. R. & L. Co., 1912, 10 R.C. 1, 240; Meyer *et al.* *v.* Sheboygan C. Lt. Co., 1913, 11 R.C., 309, 315.

The return of the manager, as such, will be simply a salary.[2] If also a holder of sufficient stock to be considered a member of the entrepreneurial group his return will be both a stipulated amount, a salary, and an uncertain amount, profits (by whatever name designated) which will depend on the varying forces of the enterprise and take one or more of the forms above mentioned. The relation which exists between the two amounts is an interesting and important one. Commission decisions are replete with cases in which there has been a minute scrutiny of the salaries paid officers to ascertain whether or not they contained elements more properly charged to corporate income.[3]

[1] It may be well to state conditionally that the use of the term profit in this latter sense is perhaps somewhat too general. When in this treatise the necessity of rewarding extra efficiency is stressed there is some question as to the propriety of using simply the word profit in connection therewith.

[2] It is unfortunate that statistics of salaries paid public utility managers are not generally available. A few of the state commission reports contain limited salary statistics. Thus the Massachusetts reports give the salaries of officials who receive six thousand per annum or more. If more information of this character were available the present treatment of this problem would be greatly facilitated. F. L. Paine, writing in the *Financial World*, has shown how large pre-war railroad managers' salaries were. The highest paid railway man was R. S. Lovett, chairman of the board of directors of the Union Pacific, who received in 1917 a salary of $104,000 (quoted in Washington, D.C., *Star*, December 21, 1919). But the late Theodore P. Shonts, president of the New York Railway Company, received a salary of $93,000 (*The Public*, January 11, 1919, p. 46). From such an upper limit as this or perhaps even higher one, salaries in the utility field run down to a few thousand and to even less. It is manifestly difficult to generalize in the face of such a variety of conditions as this.

[3] Cf., for example, 4 Wis. R. C. R., 501, 637–38; 7, 628; 16, 23, 29.

Economic writers have used the term wages of management to designate that part of the remuneration of entrepreneurs which corresponds to what they could earn as salaries if they were in the employ of others.[1] This appears to be a rather unfortunate use of a very expressive term. If it be broadened to include the wages paid the non-entrepreneurial manager we should accept it unhesitatingly. However, since established usage does not sanction such a broadening of the term, the term salary will be applied to both the remuneration of the non-entrepreneurial manager and to that portion of the return which an entrepreneurial manager obtains that corresponds to what he would obtain if he were only a non-entrepreneurial manager.

There are a few cases in public utilities where in addition to salaries a bonus of some sort is paid. To this matter we shall devote some attention in the last chapter.

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[1] Thus Seager (*Principles of Economics*, pp. 172, 174) says wages-of-management are "the minimum profit necessary to induce him (the entrepreneur) to continue to serve industrial society in his enterpriser capacity," and again, "the maximum return of which he has reasonable assurance in some other employment to which he can readily turn and which is equally easy and congenial, is the minimum that he will be willing to accept for any length of time and continue a shoe manufacturer (the type of entrepreneur used as an example). This is his wages-of-management. In normal times his profits must equal at least this sum or he will cease to serve society in this capacity."

CHAPTER V

METHODS AT PRESENT USED TO PROMOTE EFFICIENCY IN THE MANAGEMENT OF PUBLIC UTILITIES

PUBLIC utilities, like any other form of business activity, have felt the effects of growth and the attainment of a relatively high degree of maturity. In their earliest days they had all of the characteristics of a competitive industry. Speculation was rife, pioneering was necessary, and many of the features of "frontier trade" were present. Great profits were made and great losses were sustained. Being in a "sellers' market," franchises were easily secured and readily controlled and regulations of business practices were either absent or entirely inadequate. Evils incident to a time when principles of business ethics were not so well understood or so highly esteemed as they are at present were experienced. Promotions were more commonly for speculative rather than for substantial operating purposes. Capitalization was within the complete control of the group of inside stockholders and represented their estimate of what the property could be made to appear to be worth.[1]

Our Problem One of Recent Origin

Naturally, then, in the years preceding regulation there was no need for inspiring any one to be efficient. Changes were so rapid, profits (gained from manipulation, the original conception of a profitable opportunity, or from operation, it mattered not) were so eagerly sought, and there were such great possibilities of major developments in the operating as well as in the financial technique, that any thought of the relatively small economies which attention to efficiency might bring about would have been brushed aside as being inconceivably unimportant. This was an era in which refinements simply did not count.

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[1] Since this paragraph merely reviews a familiar phase of utility development there is felt to be no need for a citation of authorities. It would be highly enlightening to present some statistics showing the average profit earned or losses sustained during this period and whence these profits and losses came. To do so is impossible, however, owing to the absence of the necessary information. While some statistics could be worked up from individual companies' records, to obtain even these would be an arduous task and would add little to what is generally accepted by investigators [illegible] [illegible] truism.

It may, then, be supposed that in this period all the factors which shared in management were engagingly motivated and probably, as a rule, amply remunerated for such effort as was well or effectively expended.[1]

The Introduction of Regulation

Into such a situation as this regulation was introduced. It first took the form of increasingly stringent municipal franchise and ordinance requirements and then gradually developed into the now familiar form of state regulation. The effects on efficiency and the seeking for efficiency which commission regulation, or regulation of any sort, for that matter, produces, have already been considered. It will be well, however, before taking up the various methods used at present to stimulate efficiency in the management of public utilities, to indicate the ways in which regulation in its usual or unrefined form, and increased maturity, have affected the functioning of the motives which, as the analysis in the preceding chapter shows, are involved.

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[1] It is to be remembered, of course, that the duration of this period varied considerably according to the kind of utility and to the time at which this early development took place. Gas and water passed through this stage many years and decades ago and probably with them the duration of the period was long. The electric light and power and electric railway utilities passed through this period roughly in the years 1885 to 1907 and with them it was of relatively short duration. The telephone industry had its beginnings at about the same time and is, one might say, still in this relatively immature stage of development.

Regulation is not a single, unique thing. It is only with difficulty that its general outlines can be made out. All the variables which local economic, physical, political, and social conditions, and the varying personalities of the commissioners and the courts produce, must be taken into account. A general type of regulatory process has, however, been evolved and it is of this that we have spoken in preceding chapters.

Briefly summarized, the argument presented in Chapter III was to the effect that regulation, through adhering to the doctrine that a public utility is entitled to a fair return on the fair value of its property and to no more than this, and through its control of various collateral aspects of utility management, has created a situation in which little or no incentive is left the management to rise to the highest practicable level of efficiency, but rather has brought about a situation in which, in many respects, a premium is placed on inertia and inefficiency. The various stages in the development of regulation — the introduction of regulation to correct specific evils, the early experiments, trials and errors, the gradual enlargement of regulative authority, etc. — and in the fully developed regulatory process — the valuation of the property, the determination of proper operating and capital charges and of a fair rate of return, the setting of rates, etc. — have been dwelt upon at length. Within the limits of these prescribed and, for the most part, necessary restraints all individual activity must take place.

Regulation has tended more and more to eliminate the element of profits and to reduce the return on investment to an amount which more and more nearly approaches the pure rate of interest, plus the necessary incidental expenses. This tendency is inherent in the very principle of regulation itself, the practice of regulation has consistently brought about the condition noted, and such statistical evidence as is available adequately supports the generalization.[1]

Transition to Regulated Management and the Pecuniary Motive

Granting that average earnings tended to approximate the interest rate, can it be said that there was a corresponding decline in the effort expended to realize earnings and in the efficiency shown in the managing of public utility enterprises? Probably there was not, at least not immediately. While it is extremely difficult to generalize safely, certain results may reasonably be expected to follow from such a situation. If investments in other lines offered more ample returns with no greater risk there would be a tendency for the free capital and the better class of unattached business ability to go to other lines of employment. This general situation, coupled with the deliberate tendency to reduce earnings on public utility investments to a "fair" amount, undoubtedly drove out one type of investor and entrepreneur who gave way to types which were less pioneering in character and which preferred a relatively small but assured return to a larger but uncertain one.

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[1] There is an unmistakable tendency toward a common level of return allowance. This allowance tends to hover around six or seven per cent. The larger percentages allowed in some cases may include a depreciation allowance, which obviously should not enter into consideration in this connection. The tendency to allow a larger return for some utilities than for others is attributable to the greater risks involved, and the tendency of some states to allow a higher general rate of return than others is attributable to the general investment conditions in those states. Sterrett, J. E., in "The Comparative Yield on Trade and Public Service Investments," *American Economic Review*, March, 1918, vol. VI, pp. 1–8, has shown that utility investments yield a lower return than industrial investments. There may be some doubt as to the validity of his proof in some particulars, but there can be no doubt as to the accuracy of his general conclusion.

A word of caution is necessary, however. The elimination of the profit element does not necessarily imply that there has been a reduction in the average rate of return actually earned on utility investments. While the earning of abnormal profits from utility operation has been rendered practically impossible, it must be remembered that before the advent of regulation many utility undertakings were earning relatively little, and also that regulation has tended somewhat to protect and make it possible for the less profitable undertakings to rise to its level of average prosperity. Thus, H. M. Byllesby, the utility operator, in speaking some years ago of the return on utility investments, remarked that regulation has supplanted the "law of averages" (i.e., lean years *vs.* fat years). He said: "Probably viewing the past and considering both the failures and successes of such enterprises, the capital invested has received a smaller total profit on its total amount than in the average of mercantile, commercial, manufacturing, or trading companies." (*New York Commercial*, December 14, 1912.) Conditions from the utility point of view have become much worse since this was written. In 1912 utility regulation was really only getting into its harness.

The necessary consequence of this situation, namely, a reduction of effort or quality of effort, was in part, perhaps, offset by a force which already has been referred to, viz., the attempt, in the face of a profit-reducing regulatory process, to increase or at least maintain profits by paying attention to matters which were entirely neglected when regulation was not a factor in the situation. There is also to be borne in mind a tremendously important source of increased efficiency, one to which we should not fail to give proper emphasis, viz., the improvement of technical processes and appliances through the activities of the producers of the apparatus and equipment used by utility companies. These manufacturers, while sometimes indirectly interested in utility operation through investments in utility securities, never have been themselves subject to regulation and their motives are therefore stimulated without substantial abatement.

At what point these various forces making for and against efficiency were balanced it is impossible to say. It all depended on the conjuncture of certain circumstances: individual preferences and dispositions, the existing condition of the specific utility enterprise, external economic conditions, and technical developments over which the individual operating plant had relatively little control. But a careful weighing of all these contrary elements would probably point to the conclusion that there has been a steady, insidious decline in the average attention paid to improvements and other matters of efficiency, with the result that an increasing degree of stagnation overtook and pervaded public utility enterprises as a class. This tendency has been a slow and unnoticed one and one which has been realized by students of utility problems only very recently. The present essay, for instance, would not have been written ten or fifteen years ago. We are only gradually arousing ourselves to an appreciation of the seriousness of the situation.

Functioning of Other Motives after Introduction of Regulation

What has been said about the pecuniary motive as it applies to the two branches of the entrepreneurial group, applies equally well to the other motives which influence this group. Thus with a decline in the size of the prizes and in the opportunity for the free play of business talent there was undoubtedly a gradual lowering of the general plane on which emulation took place. While emulation itself is still abundantly present, it is as a general rule the emulation of lesser men and lacks that largeness of conception and picturesqueness which had characterized it in the earlier period. The utility field still attracts men of great ability and prowess, but these have become relatively few in number, partly, it is true, as a result of the centralization of control which syndication has brought about.

Passing now to the non-entrepreneurial manager, to what extent and how well was he motivated under the usual, unrefined workings of the regulatory process? Inasmuch as his remuneration most commonly takes the form of a fixed salary, the question, so far as the pecuniary motive is concerned, becomes one of determining the extent to which this salary payment has met the requirement of furnishing complete and properly balanced motivation. This question resolves itself in turn into two further questions, viz., have the salaries of such managers been so liberal as compared with those paid in other lines of work to which they might turn as to furnish them with ample inducement for making extra efforts, and has the individual manager shared in the benefits of his own efficient management to the full extent desirable.

The available statistics bearing on this question are quite inadequate. But salaries in the utility field have always been proverbially low. Why this has been and still is the case cannot be definitely determined. Possibly the size of public utilities has been a factor. Thus either exceptional largeness or smallness would tend to depress salaries. Further it is to be noted that public utility work requires and results in a high degree of specialization and thus leads to a very considerable decrease in the mobility of those who enter upon it. A mechanical or chemical or civil engineer who enters the employ of a gas company, for instance, cannot readily transfer his knowledge and experience to some other line of business, such as manufacturing. This no doubt is a fundamental consideration. There is also a willingness on the part of some types of young men to sacrifice some immediate return for the opportunity or possibility of entering the entrepreneurial class. They have also been attracted perhaps by the intrinsic interest and greater certainty of utility employment and by the prospects of advancing along certain more or less well-established lines toward positions of large responsibility.

Such evidence as is available would not seem to show that the salaries themselves were generally so liberal as to call forth exceptional efforts and a keen competition for positions. Rather just the converse. Of course a multitude of considerations enter in here to make it difficult and dangerous to generalize.

Turning to the second question proposed above, it will be apparent that the manner of sharing the increased remuneration which commissions allow exceptionally well-managed utilities to earn, involves questions of justice as well as of expediency. If the utility owners take all of the benefits to themselves one result will follow; if in some way the individual manager benefits exclusively, another result will follow; if the benefits are shared by both, still another result may be expected. But the present discussion is limited to things as they usually are, with none of the refinements in regulatory practice which are implied in this statement of possibilities.

What the practice of the different utility undertakings is as to allowing the manager to see a direct relation between his added efforts and his own compensation it is difficult to say. Information of this sort would be of little value if not collected over a wide area, since each company has its own policy. But certain general statements can be made. One is that inexorable economic law precludes any manager from obtaining any more for his services, however efficient they may be, than the value which competitive conditions assign them. The result is the familiar one that there is a constant tendency for remuneration to decline relatively, even in the face of better education and greater intrinsic ability and output per man, as the number of managers increases and as management becomes more and more a matter of established precedents and principles. In so far as this tendency has existed it has driven the more capable and enterprising young men out of the utility field, just as the more capable and intrepid entrepreneurs have gone into more promising lines of endeavor.

Another equally evident conclusion is that those companies in the end have prospered most which have pursued a liberal and enlightened policy in dealing with their managerial employees. Business sagacity shows itself in striking a proper balance between contrary forces and in adopting a policy which will make clear to the individual manager that there is some direct and tangible relation between extra efforts put forth by him and his reward therefore. There is such a considerable variation in the practices of companies in this particular and our information is of necessity so incomplete that it is impossible to go beyond these generalizations.

As for the functioning of the non-pecuniary motives of the non-entrepreneurial managerial group, which we have seen to be principally professional zeal and social self-esteem, there are forces which have increased and forces which have decreased their strength. Contributing to the weakening of the former of these motives are the effects of age and of increased numbers. At an earlier date when electric utilities, for example, were new there was a process of natural selection which resulted in a large part of the personnel so employed being devotedly interested in the work they were engaged in doing. Now the zest which is produced by working in a rapidly developing industry is somewhat lacking. Then, again, with an increase in numbers there is a tendency for those to be engaged who are of lesser ability and more and more lacking in a real personal interest in their work.[1] The spread of syndicate control with the resulting subordination of hired managers to central agencies may be a direct cause of much of this decline in personal interest. The same tendency is found in all branches of American industry. The personal reaction to such control is something intangible which defies statistical weighing. It is significant that the number of motive studies now appearing in economic and psychological literature, with their emphasis on the "instinct of workmanship," "the creative instinct," etc., is increasing.

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[1] Managers are in large measure engineers by training, and it is the universal opinion of those close to developments in engineering education that there has been a serious decline in the average quality of students received and graduated.

There is no doubting the fact that managers, as a class, feel the effects of this centralized control.

Working contrariwise are the effects of the various associations of managers which bring them together for the purpose of exchanging experiences and problems, forming acquaintances, and stimulating them to renewed interest in their work. Isolation and habit are in a degree broken down by such organizations as well as by the technical press. Every kind of utility has at least one such association and magazine, and some have several.

There is nothing which approaches an organization of managers for purposes of collective action against their employers. Managers are commonly thought to be in and of the employing class, although this view is being broken down to some extent now,[1] and any class consciousness they may feel is of a pacific rather than combative character.

The importance which attaches to the seeking of social self-esteem is again something which evades quantitative measurement. It is a less definite force than even professional zeal. But probably it is possible to say with some claim to accuracy that this motive, while undoubtedly constant from period to period, has been more and more appealed to as public utility problems and the problems of management have become more complex and taxing. The utility manager occupies a better known and probably better appreciated position in his community than was the case a few years ago. His functions are seen to be many in number and wide in scope. His rôle as a leading citizen has increased the civic responsibilities which he bears.

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[1] Thus there is a very slight tendency in the United States toward unionization among those from whom utility managers are recruited. This is still truer of England and some of the Continental countries. But the test of class affiliation which union membership applies is usually passed by by the more ambitious and able young men. The reason is, of course, a lack of common interest with other workers and a desire to get into the directing class.

He is therefore more apt to emphasize and to be guided by the promptings which a desire to stand well in the eyes of all interested parties produces in him.

Somewhat militating against this tendency, it is true, is the effect of syndicate control. Such control is apt to mean the rapid shifting of management personnel, and in so far as it does it disinclines an individual manager and a community to take a real and permanent interest in one another. A "native son" is more likely to feel the promptings of seeking social self-esteem. But of course it is not true that syndicate managers are in every instance or generally, like British officials, sent out to rule foreign provinces. In many instances they are either home talent, perhaps an inheritance from a purchased utility, or individuals who have been in charge of a local utility's affairs for a number of years.

Let us turn next to a discussion of the various ways in which "artificial stimulants" have been applied to overcome some of the evils of unmitigated regulation and of maturity of development. While these are few in number they are of surpassing importance. In each instance an attempt will be made to show what motives are particularly appealed to and what the success of the appeal is. In the ensuing chapter we shall see how these and other as yet undeveloped methods may be used so as to produce in increasing measure a higher degree of efficiency.

Sliding Scale

The first in historical order of the special methods for stimulating efficiency in the management of public utilities may properly be said to be the familiar sliding scale method of regulation as found at a surprisingly early date in England. By definition this is a form of regulation in which the rate of return which a utility is allowed to earn (or retain from earnings) varies inversely and in some designated ratio with the rates charged the public. Since the general features of this method have been made well known to American students of public utility economics through several rather extended reports made on it by American investigators[1] and through its adoption in Boston in 1906, it will be possible to limit this discussion to the following four headings: first, the conditions which gave rise to this method of regulation; second, the motives to which it was intended to appeal; third, its practical functioning; and fourth, its applicability to American conditions.

Inception and Development of Sliding Scale

The inception of the sliding scale device is to be explained solely in terms of certain historical conditions which do not exist in either England or the United States at the present time. The English gas industry, to which the sliding scale has been chiefly limited, had its beginning about the year 1810, and naturally was not at once included in the old common law conception of a public utility. It was allowed to follow its own natural bent and proclivities for many decades. During this period there was a remarkable development of the technique of the industry and extension of the use of gas. The English Parliament, from which any company wishing to engage in the manufacture and distribution of gas had to receive its special grant of authority, had made such grants liberally and with no appreciation of the fact that some restraint must be placed upon the ordinary forces of competition. Competition was therefore severe, and, more important than this, was inimical to the interests of the public. The ill-feelings which were produced by this condition, coupled with discriminations and the feeling in some instances that profits were excessive, led to the regulation, not of rates, as is the practice in the United States, but of profits. Such regulation was applied to individual companies at first and usually took the form of limiting their earnings, ordinarily to ten per cent on their paid-up capital. In 1847 a general act (the Gas Works Clauses Act) was passed, placing this limitation on the earnings of all statutory companies which have come into existence or have had their corporate powers increased since the date of its passage. At the same time a similar act was passed applicable to water supply companies, all of which still operate under it.[1]

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[1] *Report of Special Committee to consider the London Sliding Scale of Prices and Dividends as applied to Gas Companies*, Boston, 1906; Mathews, Nathan, *The Public Regulation of Gas Companies in Great Britain and Ireland, with Special Reference to the Sliding Scale*, 1905; National Civic Federation *Report on Municipal and Private Operation of Public Utilities*, 1907, especially part III, vol. II, chapter II; Whitten, R. H., *Regulation of Public Service Companies in Great Britain*, 1914, especially chapters III, VII–XIII.

Several objectionable features in the practical working of such maximum dividend provisions soon became apparent. (1) The maximum dividend itself seemed high, especially as dividends were cumulative. But probably this was not a real objection at that time since such a large rate of return was more generally encountered then than now and since the risk was considerable. (2) It placed all companies on the same footing, thus allowing a new or inefficient company to absorb the same return to capital, provided it was able to earn it, as an older or more efficient company was allowed to earn. This situation tended to induce laxity and inefficiency, for if all gas undertakings were generally able to earn about ten per cent (3) companies which could have earned more than ten per cent through increased effort were given no inducement for so doing while (4) companies which did not care to exert themselves so as to earn the allowed ten per cent or (5) companies which could not under any circumstances earn the allowed ten per cent were left entirely unaffected. Conditions were particularly complex and exasperating in London, where the many competing companies which had been engaged in supplying the city with gas with no well-defined system of districting the territory, with variations in price from company to company which seemed unreasonable to the public, and with relations with the public generally in an unsatisfactory condition, merged and became so strong as to cause the people to fear their monopoly power. Under these circumstances it naturally occurred to the Board of Trade, together with Parliamentary committees, the active regulating agency, that some method was needed to induce the companies to *reduce the prices* they were charging for gas. Various schemes were proposed to the Board and to Parliament, and after considerable compromising a "sliding scale" arrangement was accepted by one of the London companies in 1875 and soon was extended to the others. As new companies throughout England came to Parliament for grants of power or old ones came for new Parliamentary grants, they frequently asked for charters which included a sliding scale arrangement; in a few instances such provisions have been accepted by the companies at the urgent behest of the municipality served. Since 1876 the number of sliding scale companies as contrasted with maximum dividend companies has increased rapidly; in 1881, 51 out of 325 gas companies reporting to the Board of Trade were sliding scale, in 1910 nearly half were, and in 1912, the last year for which figures are available, 258 out of 521 companies in England, Wales, Scotland, and Ireland were, or 244 out of 498 in England and Wales only.[1]

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[1] See Michael and Will, *Law Relating to Gas and Water*, 6th ed., 1911.

It is to be borne in mind that the sliding scale arrangement is by no means universally in use in England. After eliminating all municipal undertakings, to which it is of course inapplicable, and all steam and light railways and tramways, electric generation and water supply undertakings, there are left relatively few companies, and of these over fifty per cent are maximum dividend companies. The sliding scale has been limited to gas undertakings, although these are chiefly the larger and older companies, and to electric power, as contrasted with electric supply, undertakings. The sliding scale as applied to electric power undertakings has really been without effect, however, since the standard rates set are invariably in excess of the rates which the companies are able under existing cost and competitive conditions to charge.[1]

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[1] Computed from *Return relating to All Authorized Gas Undertakings in the United Kingdom other than those for Local Authorities, for the year ended the 31st day of December, 1912*, Board of Trade, London, 1914.

Nothing beyond a brief mention will here be made of the elements of the sliding scale arrangement.[2] These are (a) the standard rate of dividend, usually ten per cent on the original share capital or 7 per cent or less on new issues, (b) the standard price, (c) the ratio between (a) and (b), i.e., the variation in (a) with inverse variations in (b). It has been customary to allow or require a variation of $\frac{1}{4}$ of one per cent in the dividend for each penny (two cents) variation in the price charged. Coupled with these provisions are, in the case of gas companies, the necessary sale of stock at auction or tender to insure that no profits are made through manipulation of the capitalization, and the system of responsible independent audit. It is unfortunate that space does not permit a discussion of these two excellent features of orderly and scientific utility regulation. Various reserves also are required.

Motives to which Sliding Scale appeals

What were the motives to which the sliding scale device was intended to appeal? It has already been intimated that the primary purpose in the minds of those who devised this method in the years before and after 1875 was the securing of a method which would induce the gas undertakings to reduce their prices. Efficiency was a secondary consideration, if, indeed, it figured at all in the situation at that time. Reduction of the rates charged the public, a result which Parliament or the Board of Trade could have accomplished under their legal powers only after long delays and much wrangling with each individual company, was to be brought about through furnishing the companies with an inducement to reduce their rates in the form of allowance of an increase in dividends conditioned upon a reduction of the rates charged, and through penalizing an increase in rates. How a reduction in the rates charged was to be made possible was not specifically stated, but it appears from the discussion which took place at that time that it was generally believed that the reduction of gas rates would result in a more than compensating increase in the volume of business done. This assumption seems to have been a perfectly proper one in view of the course of gas prices since 1875.

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[1] The foregoing is admittedly a very incomplete historical statement, but for our purposes it suffices to bring out the essential points. Whitten, cited above, furnishes a very able account of these various steps in the development of the sliding scale legislation.

[2] For a model sliding scale clause see Whitten, p. 119.

If such was intended to be the only source from which reductions in gas rates were to be secured we should be open to criticism as having unduly emphasized the importance of the sliding scale method in general. But various considerations weigh in the opposite direction: first, it is even now a prime requisite of good utility management to sell at a price that will develop business as well as yield satisfactory returns, and second, since the institution of the sliding scale arrangement and especially since the advent of the latest era of increasing price levels, there has been a necessary shifting of the emphasis from sales development as the source of price reduction to efficiency in the narrower sense, wherein technical matters and economies figure more prominently than they did previously.

From the foregoing remarks it can readily be seen that it was the pecuniary motive which was singled out for special stimulation. An attempt was made, in other words, to arouse an interest in price reduction solely through a monetary appeal to the owners of the capital securities of the companies in question. This monetary appeal might take any one of four forms: an increase or reduction of annual dividend payments and an increase or decrease of the market value of the securities held. The American student, accustomed as he is to frequent or manipulative sales of securities, might be inclined to infer that the latter would furnish the stronger set of motives. But the English utility companies are on an essentially different basis from that to which we are accustomed in the United States. Financial manipulation through the pyramiding of control or through the many other devices referred to in Chapter IV is a comparatively rare thing; investments are more permanently held and ownership and control are likely to be kept in families for generations. The result is a greater interest in things that conduce to the long run benefit of the company and in the amount of yearly income from securities held, rather than in an enhancement of the market value of securities held for manipulative or speculative purposes. Successful operation is, then, more likely to be the paramount consideration.

The Practical Functioning of Sliding Scale

Such, then, being the type of motive appealed to and such the manner of the appeal, what degree of success has marked the sliding scale in its practical functioning? Nothing is more difficult to analyze on a fact basis than the relationship between a stimulus and a reaction, a desire and its satisfaction.[1] One might arrive at some inductive conclusions were he to consult the interested parties in large enough numbers, making the necessary allowances for individual differences, and attempting to note the general trend of the testimony thus adduced. Little evidence of this kind is, however, available.

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[1] Whitten, chapter IX, gives a detailed discussion of the effect of variation in the sliding scale ratio on the respective shares of the company and the public. The present interest is more general and will be limited to a criticism of the type of appeal made rather than of the details as they have been developed either here or abroad. It is to be noted, however, that the percentage of increase in the return going to stockholders as an inducement to efficiency need not be large. See Whitten, pp. 140 ff For a

Nevertheless, certain external signs point to the conclusion that the sliding scale system has provided a reasonably satisfactory but not an exceptional stimulus to utility owners and managers to adopt progressive commercial policies, and, to a lesser extent, to desire to pay attention to technical and other matters, large or small, which would result in a lowered cost of production and consequently an enlarged dividend payment. If it be asked what proof of this broad statement can be adduced, the answer is that while the statement cannot be specifically proved, there is much evidence which cumulatively bears it out. Both Mathews and Whitten[1] have attempted to determine whether or not any relationship exists between the use of the sliding scale and the extent of reduction of prices. Since all gas companies are of either the maximum dividend or the sliding scale type it has seemed natural to both of these investigators to compare the results under the two methods. Mathews concludes that sliding scale companies have made a somewhat better showing, but Whitten candidly admits that the sliding scale companies cannot be said to have made a better showing on this score than the maximum dividend companies.[2]

Such statistical comparisons suffer from the difficulty of plurality of causes, for it is quite impossible to treat these

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mathematical demonstration of certain possibilities in the distribution of the results of increased efficiency see Barker, H., *Public Utility Rates*, pp. 101–05.

[1] Mathews, N., *Public Regulation of Gas Companies in Great Britain and Ireland*, pp. 102 ff.; Whitten, chapter IX, especially pp. 174–85.

[2] "The results of the above statistical comparisons are inconclusive. The statistics do not show that distinct superiority of the sliding scale system that its general approval and *a priori* reasoning would lead one to expect" (p. 178).

two systems as distinct and unrelated. The two have worked side by side; comparisons between them have constantly been made; good features of the one have served as models for the other; competition with electricity and with municipal gas works and managerial rivalry have tended to keep up the general level of efficiency of both types of company. The result is that differences in structure tend to disintegrate and become assimilated into an essential likeness of the results obtained under the two methods.

A Statistical Study of Results under Sliding Scale

There is, however, an entirely different and, it is thought, more basic point of view from which the results obtained under these two types of regulation can be studied. Comparisons based on the extent of price reduction are particularly inconclusive because of the great extent to which conditions over which the individual management has no control enter into account. While there is no possibility of entirely eliminating such irrelevant considerations, it is felt that in the following statistical analysis these are reduced to a minimum because of the very large number of companies studied and because of the classification of the companies into size groups.

In the course of this treatise it has been necessary on several occasions to criticize rather severely the lack of statistical material in the utility field in the United States. One of the causes which may be assigned for this situation is the great size of the United States and the existence of a large number of political subdivisions which collect statistics. In England the Board of Trade in the case of both privately and publicly owned gas undertakings publishes a volume of statistics which is uniform throughout England, Ireland, and Wales. It is on one of these — "Return relating to all authorized Gas Undertakings in the United Kingdom other than those of Local Authorities, for the year ended the 31st Day of December, 1912" (London, 1914, p. 103) — that the following study has been based. There are 521 companies included in this return, of which 258 nominally are sliding scale and 261 are maximum dividend companies. The year chosen is probably the most recent which could be used profitably since the war soon thereafter rendered conditions acute in the British gas industry, as will be seen later.

Out of this rich statistical material there have been chosen such items as would afford information as to (1) the total capitalization per thousand feet of gas sold; (2) the thousands of feet of gas made per ton of coal carbonized; (3) the percentage of gas unaccounted for (the difference between the amount of gas produced and that sold to the public or used by the company itself); (4) the number of consumers per mile of main; and (5) the consumption per consumer. The total capitalization consists of share capital, including premiums, and the funded debt, and is taken to represent the care and judgment exercised in the planning of the original plant investment and the adding to it from time to time. Items (2) and (3) call for no explanation. Both furnish criteria of the character of the technical or engineering management of the respective undertakings.[1] Items (4) and (5) furnish a clue to the character of the commercial development of the respective companies. With so large a number of companies and five distinct bases of comparison it would seem that conditions are favorable to the obtaining of some definitive results.

The results of this study are presented in the accompanying five tables, numbers XVIII to XXII.[2]

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[1] The consumption of oil and other such materials for the manufacture of water gas has been disregarded. Water gas is much less common in England than it is in the United States.

[2] The reader is asked to recall the discussion in Chapter II of the necessity for evaluating separately each of the twenty-six items used in the analysis of the efficiency of the eight Massachusetts electric companies in order to ascertain whether a large numerical result is a good or poor showing.

TABLE XVIII. — ENGLISH GAS COMPANIES. — COMPARISON OF SLIDING SCALE AND MAXIMUM DIVIDEND COMPANIES AS TO THEIR CAPITALIZATION, IN POUNDS STERLING, PER THOUSAND CUBIC FEET OF GAS SOLD

Size and kind of company	Total	Capitalization, in pounds, per thousand cubic feet sold													Average cap'n
		Under 0.3	0.3–0.4	0.4–0.5	0.5–0.6	0.6–0.7	0.7–0.8	0.8–0.9	0.9–1.0	1.0–1.5	1.5–2.0	2.0–3.0	3.0–5.0	Over 5.0	
	Number of companies														
All companies	411	12	7	32	50	60	47	31	33	87	24	18	4	6	..
S. Sc.	191	6	4	17	23	31	22	16	21	35	12	2	1	1	..
Max. D.	220	6	3	15	27	29	25	15	12	52	12	16	3	5	..
Under 20,000 M:[1]															
S. Sc.	40	..	..	1	4	6	4	..	[illegible]	11	8	1	1	1	1.32
Max. D.	104	..	..	2	7	7	8	7	8	37	9	11	3	5	1.74
20–50,000 M:															
S. Sc.	70	2	2	6	7	9	11	8	8	13	4	..	..	..	.63
Max. D.	49	1	1	4	11	3	7	3	2	11	3	3	..	..	.89
50–100,000 M:															
S. Sc	42	1	..	2	9	7	5	3	[illegible]	6	..	1	..	..	.80
Max. D.	31	2	..	3	6	8	3	4	1	3	..	1	..	..	.72
100–250,000 M:															
S. Sc	23	1	2	4	1	5	1	3	2	4	..	..	..	..	.71
Max. D.	22	..	1	4	3	6	5	1	..	1	..	1	..	..	.75
Over 250,000 M:															
S. Sc.	16	[illegible]	..	4	2	4	1	2	..	1	..	..	..	..	.59
Max. D.	14	3	1	2	..	5	2	..	1	..	..	..	..	..	.53
	Percentage distribution of companies														
All companies	100	2.9	1.7	7.8	12.3	14.6	11.4	7.5	8.0	21.2	5.8	4.4	1.0	1.4	..
S. Sc.	100	3.1	2.2	8.9	12.0	16.3	11.5	8.4	11.0	18.3	6.3	1.0	0.5	0.5	..
Max. D.	100	2.7	1.4	6.8	12.3	13.2	11.4	6.8	5.4	23.6	5.4	7.2	1.5	2.3	..
Under 20,000 M:															
S. Sc.	100	..	..	2.5	10.0	15.0	10.0	..	7.5	27.5	20.0	2.5	2.5	2.5	..
Max. D.	100	..	..	1.9	6.7	6.7	7.7	6.7	7.7	35.6	8.6	10.6	2.9	4.8	..
20–50,000 M:															
S. Sc.	100	2.9	2.9	8.6	10.0	12.9	15.7	11.4	11.4	18.6	5.7	..	..	..	..
Max. D.	100	2.0	2.0	8.2	22.4	6.1	14.3	6.1	4.1	22.4	6.1	6.1	..	..	..
50–100,000 M:															
S. Sc.	100	2.4	..	4.8	21.4	16.7	11.9	7.1	19.0	14.3	..	2.4	..	..	..
Max. D.	100	6.5	..	9.7	19.3	25.8	9.7	12.9	3.2	9.7	..	3.2	..	..	..
100–250,000 M:															
S. Sc.	100	4.3	8.6	17.4	4.3	21.7	4.3	13.0	8.7	17.4	..	..	..	..	..
Max. D.	100	..	4.5	18.1	13.6	27.3	22.7	4.5	..	4.5	..	4.5	..	..	..
Over 250,000 M:															
S. Sc.	100	12.5	..	25.0	12.5	25.0	6.2	12.5	..	6.2	..	..	..	..	..
Max. D.	100	21.4	7.1	14.3	..	35.7	14.3	..	7.1	..	..	..	..	..	..

[1] That is, companies having annual sales of less than 20,000,000 cubic feet.

TABLE XIX. — ENGLISH GAS COMPANIES. — COMPARISON OF SLIDING SCALE AND MAXIMUM DIVIDEND COMPANIES AS TO THOUSAND CUBIC FEET OF GAS MADE PER TON OF COAL CARBONIZED

Size and kind of company	Total	Thousand cubic feet of gas made per ton of coal carbonized												Average
		Under 8	8-9	9-10	10-11	11-12	12-13	13-14	14-15	15-18	18-21	21-24	Over 24	
	Number of companies													
All companies	513	12	13	79	184	138	37	13	9	13	11	3	1	..
S. Sc.	257	1	4	34	89	80	24	3	3	9	7	2	1	..
Max. D.	256	11	9	45	95	58	13	10	6	4	4	1	..	..
Under 20,000 M:[1]														
S. Sc.	42	1	2	13	19	7	..	..	..	..	..	..	..	10.17
Max. D.	107	11	9	27	41	15	3	1	..	..	..	..	..	9.93
20-50,000 M:														
S. Sc.	71	..	1	11	32	20	7	..	..	..	..	..	..	10.79
Max. D.	53	..	..	10	24	14	2	3	..	..	..	..	..	10.80
50-100,000 M:														
S. Sc.	53	..	1	5	21	22	1	2	1	..	..	..	..	11.02
Max. D.	38	..	..	4	20	10	4	..	..	..	..	..	..	10.90
100-250,000 M:														
S. Sc.	44	..	..	4	15	20	5	..	..	..	..	..	..	11.20
Max. D.	30	..	..	3	6	12	3	1	3	1	..	1	..	12.09
Over 250,000 M:														
S. Sc.	47	..	..	1	2	11	11	1	2	9	7	2	1	14.53
Max. D.	28	..	..	1	4	7	1	5	3	3	4	..	..	13.46
	Percentage distribution of companies													
All companies	100	2.3	2.5	15.4	35.9	26.9	7.2	2.5	1.8	2.5	2.2	0.6	0.2	..
S. Sc.	100	0.4	1.6	13.2	34.6	31.1	9.3	1.2	1.2	3.5	2.7	0.8	0.4	..
Max. D.	100	4.3	3.5	17.6	37.1	22.1	5.1	4.1	2.4	1.7	1.7	0.4	..	..
Under 20,000 M:														
S. Sc.	100	2.4	4.8	30.9	45.3	16.7	..	..	..	..	..	..	..	..
Max. D.	100	10.4	8.5	25.4	38.6	13.2	2.8	0.9	..	..	..	..	..	..
20-50,000 M:														
S. Sc.	100	..	1.4	15.5	45.1	28.1	9.9	..	..	..	..	..	..	..
Max. D.	100	..	..	18.9	45.2	26.3	3.8	5.7	..	..	..	..	..	..
50-100,000 M:														
S. Sc.	100	..	1.9	9.4	39.7	41.5	1.9	3.8	1.9	..	..	..	..	..
Max. D.	100	..	..	10.5	52.6	26.4	10.5	..	..	..	..	..	..	..
100-250,000 M:														
S. Sc.	100	..	..	9.1	34.1	45.4	11.6	..	..	..	..	..	..	..
Max. D.	100	..	..	10.0	20.0	40.0	10.0	3.3	10.0	3.3	..	3.3	..	..
Over 250,000 M:														
S. Sc.	100	..	..	2.1	4.2	23.4	23.4	2.1	4.2	19.1	14.9	4.2	2.1	..
Max. D.	100	..	..	3.6	14.3	25.0	3.6	17.9	10.7	10.7	14.3	..	..	..

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[1] That is, companies having annual sales of less than 20,000,000 cubic feet.

TABLE XX. — ENGLISH GAS COMPANIES. — COMPARISON OF SLIDING SCALE AND MAXIMUM DIVIDEND COMPANIES AS TO PERCENTAGE OF UNACCOUNTED-FOR GAS

Size and kind of company	Total	Percentage of gas produced that is unaccounted for										Average
		Under 4	4-6	6-8	8-10	10-12	12-14	14-16	16-18	18-20	20-25	Over 25	
	Number of companies												
All companies	511	22	44	80	88	87	57	47	27	13	30	16	..
S. Sc.	256	11	28	40	49	48	25	24	11	2	14	4	..
Max. D.	255	11	16	40	39	39	32	23	16	11	16	12	..
Under 20,000 M:[1]													
S. Sc.	40	1	1	2	3	8	5	5	5	2	5	3	14.76
Max. D.	105	3	2	10	14	12	16	11	11	5	11	10	14.65
20-50,000 M:													
S. Sc.	71	3	8	6	13	13	8	5	6	..	8	1	11.74
Max. D.	53	2	5	8	6	8	8	3	2	5	4	2	12.36
50-100,000 M:													
S. Sc.	53	1	4	9	8	14	9	8	..	..	..	..	10.69
Max. D.	38	1	4	6	6	9	4	6	1	1	..	..	10.48
100-250,000 M:													
S. Sc.	45	4	5	8	12	6	3	6	..	..	1	..	9.12
Max. D.	30	1	1	7	6	7	4	2	2	..	..	..	10.80
Over 250,000 M:													
S. Sc.	47	2	10	15	13	7	..	..	..	..	..	..	7.50
Max. D.	29	4	4	9	7	3	..	1	..	..	1	..	7.63
	Percentage distribution of companies												
All companies	100	4.3	8.6	15.7	17.2	17.0	11.2	9.2	5.3	2.5	5.9	3.1	..
S. Sc.	100	4.3	11.0	15.7	19.0	18.8	10.0	9.4	4.4	0.1	5.6	1.7	..
Max. D.	100	4.3	6.3	15.8	15.3	15.2	12.5	9.0	6.3	4.3	6.3	4.7	..
Under 20,000 M:													
S. Sc.	100	2.5	2.5	5.0	7.5	20.0	12.5	12.5	12.5	5.0	12.5	7.5	..
Max. D.	100	2.9	1.9	9.5	13.3	11.4	15.2	10.5	10.5	4.8	10.5	9.5	..
20-50,000 M:													
S. Sc.	100	4.2	11.3	8.5	18.3	18.3	11.3	7.0	8.5	..	11.3	1.4	..
Max. D.	100	3.8	9.4	15.1	11.3	15.1	15.1	5.7	3.8	9.4	7.5	3.[illegible]	..
50-100,000 M:													
S. Sc.	100	1.9	7.6	17.0	15.1	26.4	17.0	15.1	..	..	..	..	..
Max. D.	100	2.6	10.5	15.8	15.8	23.6	10.5	15.8	2.6	2.6	..	..	..
100-250,000 M:													
S. Sc.	100	8.9	11.1	17.8	26.6	13.3	6.7	13.3	..	..	2.2	..	..
Max. D.	100	3.3	3.3	23.3	20.0	23.3	13.3	6.6	6.6	..	..	..	..
Over 250,000 M:													
S. Sc.	100	4.3	21.3	31.9	27.6	14.9	..	..	..	..	..	..	..
Max. D.	100	13.8	13.8	31.0	24.1	10.3	..	3.4	..	..	3.4	..	..

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[1] That is, companies having annual sales of less than 20,000,000 cubic feet.

TABLE XXI. — ENGLISH GAS COMPANIES. — COMPARISON OF SLIDING SCALE AND MAXIMUM DIVIDEND COMPANIES AS TO NUMBER OF CONSUMERS SERVED PER MILE OF MAIN

Size and kind of company	Total	Number of consumers per mile of main											Average
		Under 50	50–75	75–100	100–125	125–150	150–175	175–200	200–225	225–250	250–275	Over 275	
	Number of companies												
All companies	512	46	65	90	73	62	83	36	26	10	10	11	..
S. Sc.	256	15	34	39	40	38	38	16	18	5	4	9	..
Max. D.	256	31	31	51	33	24	45	20	8	5	6	2	..
Under 20,000 M:[1]													
S. Sc.	41	8	10	12	5	1	3	2	..	..	..	..	85.3
Max. D.	106	23	20	28	10	9	11	4	1	..	..	..	88.8
20–50,000 M:													
S. Sc.	71	6	12	13	9	17	7	3	3	..	..	1	113.1
Max. D.	53	4	8	8	11	9	8	3	..	..	1	1	117.6
50–100,000 M:													
S. Sc.	53	1	7	9	12	9	7	4	2	..	1	1	127.0
Max. D.	39	2	8	9	5	4	9	4	1	1	1	..	136.8
100–250,000 M:													
S. Sc.	44	..	4	5	5	6	11	8	7	1	1	1	151.8
Max. D.	30	2	..	5	3	..	10	3	3	2	2	..	155.6
Over 250,000 M:													
S. Sc.	47	..	1	..	9	5	10	4	6	4	2	6	185.5
Max. D.	28	..	..	1	4	2	7	6	3	2	2	1	172.8
	Percentage distribution of companies												
All companies	100	9.0	12.5	17.6	14.2	12.0	16.5	7.0	5.2	1.9	1.9	2.2	..
S. Sc.	100	5.9	13.2	15.2	15.6	15.0	15.0	6.3	7.0	2.0	1.4	3.4	..
Max. D.	100	12.0	12.0	20.0	13.0	9.3	17.6	8.0	3.1	2.0	2.2	0.8	..
Under 20,000 M:													
S. Sc.	100	19.5	24.4	29.2	12.2	2.0	7.3	4.9	..	..	..	..	..
Max. D.	100	21.7	18.9	26.4	9.4	8.5	10.4	3.8	0.9	..	..	..	..
20–50,000 M:													
S. Sc.	100	8.5	16.9	18.3	12.7	24.0	9.9	4.2	4.2	..	..	1.4	..
Max. D.	100	7.6	15.1	15.1	20.8	17.0	15.1	5.7	..	..	1.9	1.9	..
50–100,000 M:													
S. Sc.	100	1.9	13.2	17.0	22.6	17.0	13.2	7.5	3.8	..	1.9	1.9	..
Max. D.	100	5.1	7.7	23.0	12.8	10.2	23.0	10.2	2.6	2.6	2.6	..	..
100–250,000 M:													
S. Sc.	100	..	9.1	11.4	11.4	13.6	25.0	6.8	15.9	2.3	2.3	2.3	..
Max. D.	100	6.6	..	16.6	10.0	..	33.3	10.0	10.0	6.6	6.6	..	..
Over 250,000 M:													
S. Sc.	100	..	2.1	..	19.1	10.6	21.2	8.5	12.8	8.5	4.3	12.8	..
Max. D.	100	..	..	3.6	14.3	7.1	25.0	21.4	10.7	7.1	7.1	3.6	..

[1] That is, companies having annual sales of less than 20,000,000 cubic feet.

TABLE XXII. — ENGLISH GAS COMPANIES. — COMPARISON OF SLIDING SCALE AND MAXIMUM DIVIDEND COMPANIES AS TO AVERAGE CONSUMPTION PER CONSUMER

Size and kind of company	Total	Consumption, per consumer per annum, in thousand cubic feet									Average
		Under 10	10–15	15–20	20–25	25–30	30–32.5	32.5–35	35–37.5	Over 37.5	
	Number of companies										
All companies	509	16	62	112	115	80	48	29	19	28	..
S. Sc.	255	6	23	39	57	53	29	18	13	17	..
Max. D.	254	10	39	73	58	27	19	11	6	11	..
Under 20,000 M:[1]											
S. Sc.	40	4	7	12	8	4	1	2	1	1	19.9
Max. D.	105	10	19	44	16	6	3	1	2	4	19.3
20-50,000 M:											
S. Sc	71	2	10	10	21	13	5	2	..	8	25.2
Max. D.	53	..	10	13	18	5	3	2	..	2	21.6
50-100,000 M:											
S. Sc.	53	..	5	6	12	11	9	[illegible]	6	1	26.1
Max. D.	38	..	8	9	13	3	2	1	1	1	20.2
100-250,000 M:											
S. Sc.	44	..	1	8	9	13	8	5	..	..	26.0
Max. D.	30	..	1	7	6	6	5	3	1	1	26.0
Over 250,000 M:											
S. Sc.	47	..	..	8	7	12	6	6	6	7	30.4
Max. D.	28	..	1	..	5	7	6	4	2	8	29.6
	Percentage distribution of companies										
All companies	100	3.1	12.3	22.0	22.4	15.7	9.4	5.8	3.8	5.5	..
S. Sc.	100	2.3	9.0	15.3	22.	20.8	11.4	7.0	5.3	6.6	..
Max. D	100	3.8	15.4	28.9	23.0	10.6	7.4	4.3	2.4	4.2	..
Under 20,000 M:											..
S. Sc.	100	10.0	17.5	30.0	20.0	10.0	2.5	5.0	2.5	2.5	..
Max. D.	100	9.5	18.1	41.9	15.2	5.7	2.9	0.9	1.9	3.8	..
20-50,000 M:											
S. Sc.	100	2.8	14.0	14.0	29.4	18.3	7.0	2.8	..	12.0	..
Max. D.	100	..	18.9	24.5	34.0	9.5	5.7	3.8	..	3.8	..
50-100,000 M:											
S. Sc.	100	..	9.4	11.3	22.6	20.8	17.1	5.7	11.3	1.9	..
Max. D	100	..	21.0	23.7	34.2	7.9	5.3	2.6	2.6	2.6	..
100-250,000 M:											
S. Sc.	100	..	2.2	18.2	20.5	29.7	18.2	11.2	..	..	..
Max. D.	100	..	8.3	23.3	20.0	19.9	16.6	10.0	3.3	3.3	..
Over 250,000 M:											
S. Sc.	100	..	..	6.4	14.9	25.5	12.8	12.8	12.8	14.9	..
Max. D.	100	..	3.6	..	17.8	25.0	21.4	14.3	7.1	10.7	..

[1] That is, companies having annual sales of less than 20,000,000 cubic feet.

A careful analysis of the percentage distribution figures has revealed no conclusion other than the one partially anticipated from the outset: viz., that neither type of company can be said to show distinctively better results than the other. On some items, such as consumption per consumer and unaccounted for gas, the sliding scale companies show somewhat better results, while on at least one other item, consumption per mile of main, the maximum dividend companies seem to be somewhat better. In some cases the smaller companies of one type are superior to the smaller companies of the other type, while as to the same item the larger companies would be inferior to the larger companies of the other type. Thus the 100,000–250,000 maximum dividend companies are decidedly better than the sliding scale companies of the same size as to capitalization per thousand cubic feet of gas made, while in the next higher group the sliding scale companies are slightly better. In nearly every case, it is to be added, the differences in the showings made are insufficient to justify precise inductions from them.

Conclusions

This study has, perhaps, carried the comparison a little further than did the one made by Whitten. Whereas he found that "the results of the above (*i.e.*, his) statistical comparison are inconclusive," the fact that no outstanding results have been obtained as a result of the present study may be looked upon as sufficiently conclusive evidence that important differences in the relative efficiencies of the two types of company do not exist. This is, in fact, the conclusion reached: while no outstanding success can be claimed for the sliding scale method, neither can it be charged with inducing inefficiency.

A little attention may be given, however, to a third and last form of evidence, viz., certain external acts or conditions which indicate an inward feeling either for or against the system.

This evidence may be considered under (a) general public satisfaction with the sliding scale arrangement; (b) general satisfaction on the part of the companies as witnessed by their seeking for sliding scale provisions and their failure to complain of the results obtained under them.[1]

The promotion of good relations with the public is one of the constructive results of the sliding scale system. We shall find that the same statement can be made of service-at-cost arrangements and that in general any scheme which makes a sincere appeal to the public has good chances of success, while any scheme whose appeal is not so direct and certain has a very serious obstacle to overcome. In so far as this is the case psychological considerations would seem to be important as they enter into public relations questions. As a general proposition it may be said that the public will pay any charge for utility service, within reasonable limits, of course, so long as it is assured that no advantage can be taken of it by a monopolistic agency.

Sliding Scale not properly related to the Motives of Management

No writer, so far as is known, has seen the necessity for relating his analysis of the functioning of the sliding scale device to the various factors which participate in the management of public utilities. This statement is itself a reflection of the fact that the sliding scale system contemplates no such refinements in its working as would result from a differentiation of the factors in management. But from the point of view of the present study it is essential to break up the management group into its parts and to see how each is affected through coming under the influence of the sliding scale arrangements.

It will be recalled that there are two main groups in which the management of public utilities rests. These groups have been designated as the entrepreneurial managerial group and the non-entrepreneurial managerial group. The first group is subdivided into (a) the immediate representatives of the controlling ownership, and (b) the "management proper" in so far as it consists of an individual who, while having an active proprietary interest due to a large holding of the utility's securities, is also actively engaged in the day-to-day direction of the affairs of the undertaking. The latter group consists of hired employees in whom the claims of ownership or proprietorship are relatively weak, if not non-existent, and who direct the day-to-day affairs of the company. No mention is made of the regulating agency, since it assumes a vastly different form in England from that which it takes in the United States.

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[1] This statement is true of the pre-war period. The war disclosed one of the characteristic weaknesses of the sliding scale device.

The foregoing analysis is admittedly based on American conditions. In England certain differences in the relationships between these groups exist. In the first place, control as such is not so covetously sought as it is in this country. There is less of the financial pyramiding and syndicate control of utilities with which we are familiar here.[1] Utility investments represent, therefore, individual holdings which are more permanent or continuing than are similar holdings in this country. Control is much more permanently held in the hands of those who are interested in each case in keeping the property intact and the utility itself a growing, expanding institution with a lasting individuality of its own.

A second and related difference is that in England company managers are more commonly engineers by training than they are in this country. The result is, aside from greater emphasis being given engineering problems, that such men are as a rule hired employees without a significant proprietary interest. This fact is of great significance, as will be seen presently.

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[1] Regressive voting arrangements and auction or tender sales of securities partly account for this difference.

The sliding scale system has made its appeal principally, if not solely, to the pecuniary motive. It takes the form of an inducement for lowering the prices charged the public. So long as this was its sole purpose it was unnecessary to distinguish between the various factors in management, since the problems involved in such price reductions were more largely commercial than technical in nature and any reward granted an individual manager for such price reductions as occurred during his régime would have been to a considerable extent gratuitous.

But the source of price reductions, which originally had been chiefly epoch-making improvements in the technique of the industry and growth of demand, both factors largely outside of the control of the individual manager, came in time to be more and more technical efficiency, efficiency in the use of materials and labor. And while the sliding scale in its customary form functioned somewhat as anticipated when its object was to induce the owners of an enterprise to reduce prices in the hope of receiving a more than proportionate increase in sales and an increase in dividends, it has become increasingly doubtful whether it functions as completely as it should at the present time when the appeal should be made rather to the manager as such instead of to those having only a proprietary interest in the business. It is on this score that the whole sliding scale arrangement is principally to be criticized. Other objections to it there undoubtedly are. The difficulties in originally setting and constantly keeping the proper basic price and the standard rate of dividends,[1] the failure therefore to distinguish between companies operating under such different conditions that a blanket form of regulation is ineffective, the creation of vested interests which become thoroughly imbedded and difficult, if not impossible, to eliminate, are all objections of importance, and there are others. But from the present point of view they are of relatively minor importance.

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[1] This difficulty has been partly overcome by the practice at the present time of not instituting a sliding scale arrangement in the case of a new company until after the lapse of a three-year trial period, during which time some knowledge of the success of the undertaking can be gained.

An Early Experiment in Rewarding Management

This is abundantly evidenced by the tendency in some cases for companies to be so satisfied with their present return that they have no desire to trouble themselves about finding ways of increasing their income. This situation is familiar to economists, although it is usually stated in connection with the propensities of workmen "to lay off" when they have earned enough to satisfy their immediate wants.[1] Such a condition could undoubtedly be largely eliminated through some modification of the sliding scale arrangement whereby the manager as such could be singled out, his motives stimulated and his efforts rewarded if constructive and good or penalized if negligent and unprofitable.[2] An early English experiment of this sort is of interest in this connection. In 1855, twenty-one years before the passage of the first sliding scale legislation, the company furnishing gas in the city of Sheffield was authorized to vary its dividends on capital and the remuneration paid to the directors and the managing director with variations in the price of gas. Thus that part of the capital of the company which was entitled to an eight per cent return could receive a ten per cent return when gas sold for 3*s*. 6*d*. or less. The managing director was allowed extra remuneration according to but not exceeding the following scale:

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[1] Cf. Fisher, *Elementary Principles of Economics*, pp. 284–86.

[2] It is significant that no important change in the sliding scale device has been made since its inception nearly fifty years ago, unless it be the reduction of the standard rate of dividend on share capital issued subsequent to the original institution of the plan.

While the price of gas exceeds 3*s.* 6*d.*, £600 a year.
While such price is at or under 3*s.* 6*d.* and more than 3*s.*, £700 a year.
While such price is at or under 3*s.*, £800 a year.

It was further provided that none of the directors, except the managing director, might receive any special remuneration so long as the price of gas exceeded 3*s.* 6*d.* When the price was 3*s.* 6*d.* or less they might receive annual sums not to exceed the following:

While the price is under 3*s.* 6*d.* and not less than 3*s.* 4*d.*, £450.
While the price is under 3*s.* 4*d.* and not less than 3*s.* 2*d.*, £600.
While the price is under 3*s.* 2*d.* and not less than 3*s.*, £750.
While the price is under 3*s.*, £900.[1]

These provisions were repealed when the company received new grants of power from Parliament in 1866. Evidence is lacking as to why they were repealed and as to what use was made of them while they were still effective. No doubt the scheme proved then to be too intricate to invite general use of it. But the experiment is extremely interesting and suggestive of the form which such direct motivation of the management might take. Management should be thought of as a distinct interest to be appealed to directly and not simply through the uncertain and slow process of allowing salary increases on a showing of increased efficiency. And while not wishing to overemphasize the pecuniary motive as it applies to the non-entrepreneurial managerial class, it is felt that so extended a system of special motivation as the sliding scale system in England should pay more attention to the problem of appealing to that class of people who can do the most to improve conditions. The positive suggestions made in this treatise tend to crystallize in the form of special recognition and rewarding of management *per se.* The fact basis upon which this rewarding is possible is common to all of these suggestions and consists of such a full knowledge of standards of good service and of good operating and financial conditions and such well-developed, uniform and timely statistical records as will make such recognition easy and such rewarding direct and unmistakable.

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[1] Whitten, pp. 106–07.

Applicability of Sliding Scale to the United States

The sliding scale is by no means unknown in the United States. Its earliest and for a long time its sole application was in the case of the Boston Consolidated Gas Company. It was studied quite thoroughly and a special legislative committee was sent to England to obtain first-hand information about it. This committee rendered a majority and a minority report.[1] The majority of the committee disapproved of the proposal to apply the sliding scale to all or any of the Massachusetts gas companies, partly on the ground that such statistical evidence as could be found did not show it to have any marked advantages, but chiefly because "it is obvious that to adopt the sliding scale here certain fundamental principles, on which the present laws and policy of the Commonwealth rest, must be abandoned."[2] The step was too radical a departure, it was thought, from our traditions and institutions.

Despite this objection the sliding scale principle was applied to the Boston Consolidated Gas Company in 1906, subject to revision after a period of ten years. The antecedent conditions, a bad competitive situation and an unwholesome relationship between the companies and the public, were similar to the conditions which led to the adoption of the sliding scale principle in London. The object in instituting the sliding scale arrangement, as indicated by the title of the act, "An Act to promote the reduction of the price of gas in the city of Boston and its vicinity,"[1] was similar to that which was back of the original institution of the sliding scale provision in England in 1876. The terms were more liberal than those common in England.

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[1] *Report of Special Committee to consider the London Sliding Scale of Prices and Dividends as applied to Gas Companies,* Boston, 1906, p. 85.

[2] *Report,* p. 46.

Results of Use of Sliding Scale in Boston

So far as can be ascertained, no marked success or failure has characterized the plan. An attempt to build up any conclusive statistical proof of this statement would be futile since with only the one case and with many special conditions affecting it no separation of the direct consequences of the sliding scale method is possible. Upon this matter some evidence is to be found in statements of the Board of Gas and Electric Light Commissioners.

In accordance with the provisions of the 1906 legislation the Board of Gas and Electric Light Commissioners in 1916 made a report upon the operation of the sliding scale act.[2] This report is based upon the careful observations of the Board together with special investigations made for the purpose. The opinion of the Board is unquestionably unfavorable to the sliding scale.

Certain beneficial results have been achieved since 1906. Thus "there has been unquestionably a decrease in the net cost at the burner of the gas sold during the period due to the enterprise and commercial skill of the management. But the same is true of companies not under the 'sliding scale' and is attributable to a greatly increased output without any corresponding increase in the actual expenses. Undoubtedly reductions in price have contributed to this result." Appendices G and H[3] show this clearly and that some Massachusetts gas companies, despite the fact that they are necessarily smaller than the Boston company, have reduced their rates more than the Boston company has.[1] Better service conditions and a better attitude of and toward the public have also resulted, but these can be only partially attributed to the sliding scale.[2] The thorough discussion of the Boston gas situation in the years preceding 1906 and the resulting demand for an efficient and well-disposed management no doubt more fully account for these results. The company's affairs have been largely taken out of politics but not because of the sliding scale.

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[1] Chapter 422, Acts of 1906.

[2] Report on sliding scale . . . to Legislature, March 1, 1916, *32d Annual Report,* Board of Gas and Electric Light Commissioners, 1916, pp. 448a–500a.

[3] Pp. 499a–500a.

The positive good which has resulted from this experiment, for so it is regarded by the Board, is therefore little. "There is, in fact, reason to believe that under the conditions which have existed" (principally trading relations within the Massachusetts Gas Companies, the holding company, which, through setting up a source of profit other than the dividend increment resulting from a reduction in rates charged, have to a certain extent defeated the purpose of the Sliding Scale Act, and also because the sale of additional stock at public auction is negatived through these intercompany relations) "the 'sliding scale' has not had a fair trial. . . ." [3] Depreciation has not been properly taken care of; ". . . it was also stated (at a hearing) that 'the incentive of the sliding scale is first felt by the financial managers of the company; they want more dividends,'" and therefore sacrifice permanent to temporary advantages. The Board also objects to the plan because it takes away such control over this company as it exercises over the other gas companies of the state. Its only power over the company arises from its control of capitalization (largely nullified, as has been stated) and its right to revise, after ten years, the standard price under certain conditions and upon petitions from certain sources. It also refers to the practical difficulties involved in trying to project into the future the details of such an arrangement, and refers to the relatively greater difficulties which British sliding scale companies have encountered as compared with the maximum dividend companies.[1]

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[1] The Boston company reduced its gas rate from 90 cents per thousand to 85 cents on June 30, 1906, and to 80 cents on July 1, 1917. On January 1, 1918, the price was again placed at 90 cents, the standard rate set in the Act of 1906. In October, 1918, the rate was raised by special act of the Board to $1.00 because of "changes in the prices of material and labor." (*34th Annual Report,* Gas and Electric Light Commission, 1918, pp. 72–76.) On March 5, 1920, the rate became $1.10, and on July 23, 1920, $1.35 (P.U.R., 1921B, 56).

[2] *32d Annual Report,* Board of Gas and Electric Light Commissioners, 1916, p. 465a.

[3] *Ibid.,* 476a.

The Board is, therefore, "of the opinion and recommends that the act shall be repealed unless the Boston Company is entirely dissociated from the Massachusetts Gas Companies. . . . If that is done a few years of further experience should develop conclusively the relative advantages or disadvantages of this system of public regulation." [2] The Board is opposed to the extension of the application of the system to other Massachusetts gas companies. ". . . Its investigations have not discovered any such positive advantages in the 'sliding scale' system of regulation over that still prevailing with respect to the other companies as to justify its extension. The Board, therefore, recommends that it is inexpedient to extend the 'sliding scale' to the other gas companies of the state." [3]

Another Experiment with Sliding Scale

The Indiana Public Service Commission experimented on a small scale with the sliding scale device in the years 1917 to 1919.[4] The objects sought were "self-adjusting devices that automatically will meet changing conditions, and that, with justice, will levy penalties and benefits alike on both the public utility and the public served,"[1] and the creation of "a common interest between the public utility and communities served, on the basis of reducing rates to consumers and increasing the rate of earnings for the utility, a far better condition . . . than now exists. Under such (i.e., present) conditions there has been built up a system which offers very little incentive to public utilities to work for higher efficiency. If the public utility operator is going to create antagonisms by bringing about radical economies which will increase the utility company's rate of return, then it follows in human nature that the public utility operator is not going to be inspired to create these radical changes." It is unfortunate that general conditions beyond the control of both the commission and the utility rendered it necessary for the commission to abandon this interesting experiment. When conditions become more stabilized it is to be hoped that not only this commission but other commissions will make further attempts to determine the possibility of making the sliding scale device work in this country.

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[1] *32d Annual Report,* Board of Gas and Electric Light Commissioners, 1916, p. 475a.

[2] *Ibid.,* 476a.

[3] *Ibid.,* 478a.

[4] Orders of Public Service Commission of Indiana establishing and applying to the Hydro-Electric Light and Power Company of Connersville, the Principle of the Sliding Scale Relationship between Rates to be charged and Rate of Return allowed, original order, October 29, 1917, modified order, June, 1919.

Why Sliding Scale is little used in United States

Experience with the sliding scale in the United States has been extremely limited and tends to lend an unfavorable judgment as to its possibilities. That there should be so little interest in it in this country is also evidence which tells against it. Examination of the technical literature of the utilities and of the proceedings of their meetings and of other literature which is indicative of the feelings and views of utility operators has failed to disclose any real interest in this method of regulation. Occasionally the sliding scale has been discussed by the gas profession but it has never been able to arouse any very great interest. It has also been brought up at meetings of the National

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[1] Orders, p. 23.

Electric Light Association, but the attention given to it there has been even less than that given to it by the American Gas Institute.[1] When the Board of Gas and Electric Light Commissioners in Massachusetts was examining the results of the first ten years' experience under the Boston sliding scale act it found that "no demand for the extension of the system to the other gas companies of the state developed. . . . Indeed, it was stated in behalf of certain of them, that they did not desire it unless on the basis, proposed several years ago and denied by the Legislature, of capitalizing the full value of their properties by the issue of additional stock." [2]

The only evidence so far adduced that is distinctly in favor of the system is that which comes from the Boston Consolidated Gas Company itself.[3] Other gas companies and practically all other utility companies are apathetic or opposed. Nor has any appreciable interest in the system come from the public side. None of the distinguished protagonists of the public interest, such as D. F. Wilcox, M. L. Cooke, E. M. Bemis, A. M. Todd, so far as is known, has any active interest in it and little interest is shown in it by any of the state commissions.[4] Our regulators and the public are totally unprepared for a serious consideration of the system.

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[1] Now American Gas Association. This association is reported to have undertaken recently a study of the sliding scale system.

[2] *32d Annual Report*, Board of Gas and Electric Light Commissioners, 1916, p. 477a.

[3] In 1916 Nathan Mathews made a second report on the workings of the British and Boston sliding scale system which was as favorable toward it as was his original 1905 report.

[4] In the case of Bachrach *v.* Consolidated Gas Light and Power Company of Baltimore, the Maryland Public Service Commission said: "We believe the sliding scale offers the best solution now in sight for the regulation of rates of gas and electric corporations, when the initial rate and the capitalization are equitably adjusted." (IV *Reports*, Public Service Commission of Maryland, 1913, p. 58.) Nothing was done in this instance because the company's terms were considered to be too unfavorable to the public.

Generic and Practical Objections to Sliding Scale

There must be certain fundamental reasons for this general situation. Perhaps we shall have to go back to the statement found in the majority report of the Special Massachusetts Committee, already quoted, that "it is obvious that to adopt the sliding scale here certain fundamental principles, on which the present laws and policy of the Commonwealth rest, must be abandoned." In other words, the sliding scale system of regulation does not fit in and is not compatible with American conditions, legal and economic. This statement is supported by the following considerations.

First of all, the generic reason for its original establishment no longer exists. In 1876 a wide prospect of reducing gas prices opened up and an appeal to motives that would bring such reduction about was in order. Now, both in England and the United States, an entirely different set of conditions obtains,[1] and the need for this peculiar type of appeal has passed away. The need now is principally for more direct appeal to another set of individuals, as will be seen in the concluding chapter.

Supporting this reason are certain practical legal and political difficulties. Legislation of this sort, involving as it would the direct regulation of profits, could probably not be successfully attacked on constitutional grounds, so long as it kept within the well-recognized tenets of American regulation whereby a fair return on a fair value of the property used and useful for the public is not to be denied.[2] But there doubtless would be legal controversies of an embarrassing character. Practical difficulties are numerous. The size of the country, the lack of interest, in general, in more refined processes on the part of our state commissions, all militate against any general adoption of the plan in this country.

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[1] Rates, as regulated by the commissions, are, *ipso facto*, somewhere near to rock bottom now.

[2] See Foreman, C. J., "Legal Profits of Efficiency," *Columbia Law Review*, vol. 18, pp. 550–81; vol. 19, pp. 1–28; also "Legal Theory of Profits," *Political Science Quarterly*, June, 1918.

There are also certain other practical obstacles to be overcome. The problem of originally setting up and thereafter of maintaining the proper standard rate of dividend, the standard price and the ratio of the one to the other would involve an immense amount of work if attempted on a large scale. Even in a single state the problem would be immensely difficult, since each utility's case would have to be accorded separate treatment and yet a general show of uniformity would have to be made. In England the dividend return is computed on the outstanding share capital, excluding preferred stock, and of course excluding funded debt. Obviously no such basis would be adopted in this country except in the few isolated instances where regulation has brought about a somewhat consistent relation between securities outstanding and true capital investment, as in Massachusetts. Conditions are improving in this respect, to be sure, due partly to regulation and partly to certain tendencies, such as growth of our urban population and a general rise of our urban standard of living, not excluding the "unearned increment" in land values, which have brought about a gradual accretion in the assets of utilities and have given their stock issues a substantial substratum of value. There would also have to be a very considerable conversion of preferred stocks of the various kinds and bonds into common stock if a significant portion of our total outstanding public utility securities were to be brought under the jurisdiction of the sliding scale system. This conversion process has been widespread in England.

We should also have to make certain that all other sources of profit to the stockholders be completely eliminated, for otherwise the incentive for looking to a reduction in rates charged as the sole source of increased dividend allowances would be materially weakened. To accomplish this purpose we should have to eliminate our deeply ingrained "right to subscribe" and institute a system of sale of additional securities at auction or tender. A mountain would have to be moved before this could be accomplished. Massachusetts has had no likely success with its experiment in this direction. An independent and responsible audit of the accounts of the companies would be necessary. This difficulty is not very formidable and a good example is being set by the accounting and auditing provisions of the various service-at-cost agreements.

Far outweighing all of these practical difficulties is one which has been mentioned in other connections many times, viz., the general situation which may be described as "financial control." As was pointed out a few pages back, the emphasis in England is more on operation than on financial manipulation; in the United States the operating end has been and still is consistently relegated to a secondary place. What this means is that a revolutionary change in the character of the control exercised over American utilities would have to be made if other inducements than the securing of increased dividends through price reductions are to be eliminated entirely. How utterly impossible such an unscrambling of American utility finances is, is readily apparent. It is, then, this presence of the speculative and manipulative feature which most thoroughly discountenances the sliding scale system for adoption in this country. The necessary intricacy or refinement of the system is an important supporting consideration.

Certain Lessons to be drawn from Sliding Scale

While the general conclusion reached is that the sliding scale system is not desirable in itself and not adapted or adaptable to American conditions, nevertheless certain lessons can be drawn from the many years of English experience with it. With the noting of these this discussion of the sliding scale system will be concluded.

First of all and chiefly, we may learn that, under present day conditions, no system of promoting efficiency can succeed which depends wholly on the reduction of rates as the means of increasing the rate of dividend payment. While in the gas business to-day there is much talk of making gas the only form of fuel, a development which would necessitate a vast increase in the consumption of gas and a greatly reduced scale of gas rates, with by-product coke-oven development of gas production whereby profits will arise from the sale of by-products whose prices are not subject to public regulation, this development is so vast in character and waits upon the happy conjuncture of so many unrelated circumstances that no consideration can at present be given it in connection with a proposed sliding scale system of regulation.[1] We have seen and shall see more clearly later that other motives and other managerial agencies must figure more prominently in any constructive scheme than they ever have in England and than they do at present in the United States.

Another important lesson is that any scheme which promotes a feeling of mutual trust between the public and the utility serving it is a decided gain in itself. Thus in England and in Boston an era of good feeling has succeeded an era of public disgruntlement and open suspicion, although this result is perhaps not peculiarly attributable to the sliding scale arrangement. Any scheme which calls for laying all the cards on the table enlists public support. The fact that this has been done suggests that the company and the public have agreed to certain common rules of the game and are playing fairly with one another. The public is willing to pay all costs involved in supplying it with utility service, within the implied limits of economic utility, so long as it knows that those costs are necessary and legitimate and not exploitative.[1] Herein lies an element of strength in service-at-cost and other similar devices.

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[1] Good evidence of what may be accomplished along this line is afforded by the Citizens Gas Company of Indianapolis (Ind.), whose large by-product sales enable it to put gas into the holders at no cost and to sell it at the rate of sixty cents per thousand, which is said to be the lowest in the country.

Another lesson of equal importance is this: a scheme of so-called "automatic regulation" has an inherent disadvantage in the face of any considerable change in economic conditions as compared with the usual method of regulation found in this country. The difficulties of projecting the details of such a scheme into the more and more distant future are exceedingly great and at best it is impossible to predetermine or subsequently to redetermine the extent to which allowance must be made for such external variables as in no way reflect the ability or lack of ability of the management of a utility.[2] English war experience with the sliding scale has been very trying:

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[1] Electric railways sometimes suffer what have been referred to as "resentment losses" as a result of what are felt by the public to be unwarranted increases in rates of fare.

[2] The following quotation from the decision of the Massachusetts Board of Gas and Electric Light Commissioners, when in 1918 it allowed the Boston Consolidated Gas Company to increase its rates above the maximum allowance in the sliding scale act of 1906, bears directly on this subject:

"A price so fixed (the standard price) necessarily reflected the then cost of producing and distributing gas, based on the experience not only of the Boston company, but of the industry as a whole. Obviously if such cost were to be subsequently affected by improvements in the art or other circumstances not attributable to the skill and efficiency of the management, or by decreased or increased burdens beyond its control, the standard price would no longer bear the same relation to the standard dividend as at the outset; and the stockholders might have an undue reward, notwithstanding management of a very moderate capacity, on the one hand, or on the other, might be unable to earn the stipulated return, without fault on the part of the management and in spite of the utmost skill and efficiency. . . .

". . . But it is equally true that, without fault on the part of its management and in spite of its skill and efficiency, the standard price of 90 cents no longer bears the same relation to the cost at the burner as it did in 1906, and that this is due specifically to 'changes in the prices of material and labor.'

> There is under present conditions good cause for very deep sympathy with the proprietors in some sliding scale gas companies, for the very system that maintained a happy position between them and the consumers in normal times is making their investment in gas less and less valuable as a contributor to their financial needs just at the period when their needs are the greatest. . . . They are . . . in infinitely worse case than shareholders in maximum-price companies and concerns in other industries that can better "trim their sails to the prevailing wind" by advancing prices to meet the war-imposed burdens, without maybe losing anything in the way of dividends. . . . Of course, such maleficent conditions were never contemplated at the birth of the sliding scale as applied to gas companies.[1]

The greatest care should be exercised in the drawing up of the original agreement and provisions should be made in advance for the revisions of details according to agreed upon principles. We shall see later to what extent service-at-cost franchises avoid the difficulties here referred to.

Certain minor lessons also may be drawn. The use of the auction method of sale of additional securities is a wholesome device whose use in this country could well be encouraged. The English system of audit is also a desirable thing and has advantages over the system of accounting control now in vogue in most of our states. The granting of a different rate of return upon securities issued subsequent to the original issue or at any time, in fact, is a

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"There is, however, substantial embarrassment to modifying the standard price under conditions which are so admittedly abnormal. The 'sliding scale' system of regulation makes reductions in price to the consumer depend solely upon the desire of the stockholders for greater dividends. It rests upon the belief that this desire will prove an effective stimulus to such increased skill and efficiency in management as will make lower prices to consumers probable. For its proper operation the conditions upon which the relation of price to dividend are established should be stable and likely to continue for a sufficient period to demonstrate the effectiveness of the incentives to good management. Otherwise the system will achieve little by way of actual regulation of price."

Boston Consolidated Gas Company, P.U.R., 1919A, pp. 701–02.

[1] "Sliding Scale and Dividend Shrinkage in Abnormal Times," *Journal of Gas Lighting & Water Supply*, January 25, 1916, vol. 133, p. 188.

very sensible and practical device. There has been some mention of it recently by American financial writers.[1]

The fact that in England prior attention is given to operation rather than financial matters has been referred to before. All devices looking to the shifting of the relative emphasis in the United States on these two somewhat opposed considerations should be actively encouraged.[2]

Experimentation with Sliding Scale desirable

Nothing which has been said in these remarks on the sliding scale in England should be taken as a disparagement of any attempts to experiment with it, as was done on a small scale by the Indiana Public Service Commission. Such experiments are to be welcomed, as should any other attempts of a similar character whose object is the discovery of hitherto unknown laws of cause and effect in the field of management, be it of public utilities or the ordinary type of commercial enterprise. Nor should the fact that the English experience with the sliding scale has been practically limited to gas companies be felt to require a similar limitation of the system to gas companies in this country. In the Connersville case it was applied to an electric company, and the various service-at-cost agreements, which at least equal if they do not surpass the sliding scale agreements in complexity, are principally applied to the very intricate electric railway industry.[3]

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[1] Hale, R. L., "Need for a Revised Principle of Utility Regulation," *Gas Age*, February 1, 1919. As we shall see later the service-at-cost contract drawn up for the government of the Westerville, Ohio, Branch of the Columbus Railway Company contains such a provision.

[2] See article by W. D. B. Ainey, chairman of Pennsylvania Public Service Commission, in *Aera*, September, 1919, p. 237.

[3] It is of interest in this connection to note an instance in which it was proposed to apply the sliding scale principle to a competitive industry. The Federal Trade Commission, by direction of the President, made an investigation of the reasonableness of the maximum profit limitations fixed on the meat-packing industry by the Food Administration. In a letter of June 28, 1918, transmitting its findings, the Trade Commission recommended, among other things, "that the rate (i.e., of profit) be a

Service-at-Cost

It may cause surprise to some to find service-at-cost classified as a method of stimulating efficiency, since, if it is thought of at all in this connection, it is likely to be considered a form of regulation which carries with it latent sources of inefficiency. Unalloyed service-at-cost does harbor this danger, as will be seen presently, but the more highly developed service-at-cost franchises contain provisions which aim not only to prevent inefficiency but also to furnish a positive stimulation to efficiency. It is principally because of these provisions that a consideration of service-at-cost is embraced in this discussion. Before undertaking an analysis of these provisions let us first state the true meaning of service-at-cost and sketch its development.

Meaning of Service-at-Cost

The entire period since the institution of continuous utility regulation, about 1907, may be said to have been

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sliding scale, based on volume, in weight, of animals slaughtered; thereby stimulating production of meats without directly encouraging expansion into other lines. That the normal rate for the five chief packers be seven per cent on net weight, with one half per cent increased allowance for every ten per cent increase in weight slaughtered, and one half per cent decrease in rate for every ten per cent decrease in weight slaughtered; the maximum profit allowed not to go above nine per cent. . . . That the maximum allowed the smaller packers be nine per cent, increasing on a sliding scale to eleven per cent, but without a decreasing scale. That profits in excess of the prescribed rates be either turned over to the Treasury of the United States or applied against further Government purchases." (Maximum Profit Limitation on Meat-packing Industry, Senate Doc. No. 110, p. 4.)

Food Administrator Hoover, in a letter of July 8, 1918, in reply, objected to these proposals, saying that "an advance profit regulation operates, if too strictly drawn, to curb incentive, to destroy production, and to limit efficiency. . . . There is also a psychological point of great importance; any given business enterprise would willingly pay in the shape of a tax whatever may have been its extraordinary profits. But if its profits are limited in advance to the same sum, the same enterprise will feel it is restricted, unable to protect itself against risks of loss and the reaction will damage efficiency and courage in conduct of this enterprise." (*Ibid.*, p. 7.)

one in which theory required that utility service be rendered at cost. Included in the term cost is, of course, the usual fair return on the fair value of the property used and useful in the service of the public. But theory and practice have rarely coincided. Speculative profits and losses have not been entirely eliminated; no guarantee of a return has ever been made, and likewise no promise to return to the consumers or community served any surplus over this cost and fair return was ever exacted from or would have been concurred in by the utilities. During the intervals between rate cases profits in excess of a fair return could be made and losses sustained, and there are other ways in which this purpose of regulation, the securing of fair rates and the resulting limitation of the utility to a fair return, has been circumvented.

This condition of unstable equilibrium, with its attendant intermittent throwing off and taking on of ballast, was accentuated by the war with its accompanying vast increase in prices. The net result has been an unexpected and unprepared-for rise in costs, which has reduced net earnings to little or nothing in many cases. Of all the utilities the electric railways were by far the most seriously affected by this change of conditions, and out of their straitened circumstances arose a demand that the public pay the cost of the service and thereby keep their business running and their investments from fast declining and perhaps entirely disappearing in value. To be sure, there were other factors contributing to this situation. Thus if the regulatory process had been perfectly elastic and not tied up with hard and fast franchise terms or with state commissions whose dockets were full to overflowing with urgent cases, revenue could have been increased somewhat more nearly in proportion to the increase of expenses and some at least of the difficulties recounted could have been avoided. But back of this state of affairs was still another situation, which runs back many decades and involves deep-seated beliefs and prejudices. While the exact steps differ greatly from locality to locality, the general features of this historical background are usually true to type and consist chronologically of an era of early investments in many competitive lines, speculative management and the taking out of the properties of all that could possibly be taken, a run-down condition of plant, a combination of the competing lines, often involving [illegible] series of reorganizations, each of which might add its share of excessive capitalization, but yet an era in which the five-cent fare continued on the whole and in most places to provide sufficient revenue, and, finally, rising costs and a growing recognition of the need for higher and more scientifically adjusted rates. At this time, therefore, there was need for a more coöperative attitude on the part of the utilities and the communities served. This need was just becoming felt when its importance was accentuated by the war and the conditions which the war brought in its train.

The three essential conditions which gave rise to the movement for "service-at-cost" were, then, first, rising costs, second, inelastic regulation, and third, a hostile, uncompromising or uninformed attitude of the cities toward the utilities serving them with electric railway transportation.[1]

A New Era in Utility Regulation

Service-at-cost is, then, used in a somewhat narrow and technical sense at the present time. As indicated by its name, it implies that service will be rendered at rates that will yield a return equal to, but not greater or less than, the amount necessary to pay all operating expenses, as defined, and the stipulated return on the value of the property devoted to the public use. The basic terms in any service-at-cost agreement are, therefore, from the present point of view, (1) a prescription of standards of service, with provisions looking to the maintenance of such standards, (2) a careful definition of "costs," showing the items included and excluded in each classification, (3) a valuation of the property or an agreement reached in some way as to the capital value entitled to a return, (4) a stipulated return on the agreed value. Secondary elements are (5) the creation of the necessary regulatory machinery, (6) the establishment of rate schedules which will meet the costs, (7) the establishment of reserves — depreciation, contingent and "reservoir" — to protect the investment and to make the system work somewhat automatically, (8) auditing and accounting provisions, and (9) provisions for purchase by the municipality. It is not necessary to go into detail about any of these elements at this point: certain of them will be treated at length hereinafter.[1] Enough has been said, however, to indicate that service-at-cost, in so far as its influence is felt, ushers in a new era in utility regulation. The utilities forego the speculative return which they had previously been accustomed to receive; the communities served guarantee [2] a return to the utilities serving them. The utility becomes merely an agent designated to perform a public function.

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[1] Although principally applied to the electric railway, service-at-cost has been applied to the electric and gas industries [illegible] well.

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[1] For a thoroughgoing, comparative analysis of service-at-cost franchises in all of their aspects, see Clark, H. C., *Service-at-Cost Plans. An Identical Analysis of Statutes, Ordinances, Agreements and Commission Orders in Effect, or proposed, together with a Discussion of the Essentials of Local Transportation Franchises*, 1920.

[2] The word "guarantee" is perhaps too binding legally to be used here; "assured" would doubtless be better. The point to be borne in mind is that the risk of loss is for all practical purposes eliminated, since the company is, by definition, assured a return that will cover all costs, including a return on capital. While two of the Massachusetts acts (the Boston Elevated and the Bay State) are the only ones which permit the making up of deficits from tax levies, all of the service-at-cost acts provide safeguards against loss of return which, under normal conditions, at least, are tantamount to a guarantee.

History of Service-at-Cost

The first of the service-at-cost agreements to be enacted is that embodied in the franchises granted the electric railways in Chicago in 1907. In these franchises, the holders of which later were consolidated into a single company, there were the following elements of service-at-cost as it is known to-day: control of service, including extensions, prescription of minimum expenditures for maintenance and depreciation, limitation of return on value of property to a definite amount (five per cent). An expert body, the Board of Supervising Engineers, also was established to superintend the operations of the properties as well as certain reconstruction work. These franchises also provided that the company might keep forty-five per cent of "net receipts." This latter feature has been adopted elsewhere, as will be seen presently. In 1914 a franchise bearing marked similarities to the Chicago franchises was adopted in Kansas City, Missouri. Neither this nor the Chicago franchises are in use at the present time, the Chicago franchises having been superseded and the Kansas City Railways Company being operated by a receiver.

The Cleveland franchise of 1909, modified in 1911 and extended in 1919, may, however, be considered to have been the first thoroughgoing service-at-cost franchise to have been adopted and to have been the germ out of which the service-at-cost movement later developed when economic changes called for some such a device for producing the necessary financial return and public understanding of the utilities' difficulties. Many features of the Cleveland franchise have been adopted in other cities. The historical background out of which this franchise was produced is well known. Briefly, there was need for some device which would bring the utility and the public together on an amicable basis. This result has been abundantly accomplished and Cleveland has had for many years street railway service of the highest character at exceedingly low rates.

In 1915 Des Moines, Iowa, applied a service-at-cost franchise to the Des Moines City Railway Company, but certain features of this franchise having been disallowed by the courts, it was supplanted by a new service-at-cost ordinance in 1921. In 1917 service-at-cost franchises were adopted by Dallas, Texas, applicable to the Dallas Railways Company and to the Dallas Power and Light Company, and by the County Commissioners of Franklin County, Ohio, applicable to the Westerville Division of the Columbus Railway, Power & Light Company. In 1918 the Massachusetts legislature passed three service-at-cost acts, one applicable to the Boston Elevated Railway Company, one to the Eastern Massachusetts Street Railway Company, successor to the Bay State Railway Company, and one of general application to any electric railway companies in the state which cared to operate under it. Cincinnati, Ohio, and Youngstown, Ohio, also adopted service-at-cost franchises in 1918, as did Montreal, Canada. In 1918 Ann Arbor, Michigan, applied a service-at-cost agreement to the Washtenaw Gas Company. In 1920 Rochester, New York, Toledo, Ohio, and Memphis, Tennessee, adopted such franchises, the one in Memphis being, however, adopted by order of the Tennessee Railroad and Public Utilities Commission. Findlay, Ohio, also has a service-at-cost franchise.[1]

While there have been, then, only eighteen service-at-cost franchises adopted, of which sixteen are in use at the present time, there has been a vast amount of discussion

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[1] The recency of the service-at-cost movement is thus shown:

Year	Number of instances	Year	Number of instances
1907	1	1918–1919	13
1909–1913	2	1920	16
1914–1916	3	1921–1922	18
1917	6		

and agitation about service-at-cost principles and about the adoption of service-at-cost in particular localities. Several cities, among them Denver, St. Paul and Minneapolis, Philadelphia and Buffalo, have given the plan serious consideration. In Denver, Chicago, St. Paul, and Minneapolis service-at-cost proposals have been voted down and in the Philadelphia case the Public Service Commission of Pennsylvania refused its approval of the plan formulated.

These lists fail, however, to give a true picture of the situation at the present time. It is no exaggeration to say that the service-at-cost plan has become an accepted dogma of the electric railway industry and will be extended in its application as rapidly and as far as conditions require and permit.

The chief advantage of service-at-cost, aside from its saving many utilities from complete annihilation under the weight of increased costs, is its promotion of amicability between the utility and the public. The secret of its success in this respect is its insuring both the community and the utility against exploitation. An increase of fares or rates, usually a process which gives rise to ill-feeling, is accomplished readily. If adequate power is given the city to prescribe and see to the maintenance of service standards and as to extensions and betterments, little trouble, at least little immediate trouble, should follow upon its adoption. The securing of such an agreement should work a marked improvement in the finances of a company, and while no statistics have been collected on this point, this undoubtedly has been the result.

Service-at-Cost inherently Inefficient

But, as already has been stated, the reason for including a discussion of service-at-cost in this treatise is that in it are involved certain latent tendencies that are inimical alike to the public and the utility, in the long run. Argument on this point is largely *a priori*, to be sure, since statistical or other proof is lacking at present, but if certain very proper comparisons are made with conditions which have been produced by a similar play of forces in other cases these *a priori* considerations seem not to be incorrect.

Service-at-cost assures, if it does not in fact guarantee, the reimbursement of a company for all expenses legitimately incurred, and a return on the investment. A careful delineation of the classes of items which may be included in operating expenses is usually found, but this is not to say that items properly included as to kind are not unduly large in amount. Despite the most careful accounting and auditing safeguards, there can be no adequate checking up of the amounts of entries and casting out of such amounts as are unduly large, although they represent *bona fide* expenditures on the part of the company. *In other words, the company is spending the city's (the consumers') money and not its own* and, under normal conditions, parts with it freely since its own return is in no way thereby curtailed or endangered and since the fund upon which it can draw is, within certain limits, unlimited in amount.[1]

During the war the Government faced the problem of stimulating production on an immense scale in the shortest possible time. It therefore made contracts with private interests which would never have been made in peace time when government expenditures are watched with meticulous care. These "cost-plus" contracts were made in large numbers and involved enormous sums. They practically amounted to saying: You spend my money, I will give you a profit based on what you spend, and the profit will be the larger the more you spend. The result was, of course, unnecessarily high costs to the Government. The policy was abandoned as soon as possible after its true character had been discerned. To give one person the opportunity to spend another person's money is always an expensive process. It is of course typical of the principal-agent relation throughout business life.[1]

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[1] Mention has already been made of the principal-agent relationship in utility management. See, in this connection, Professor John H. Gray's paper, "Regulation of Public Service Corporations," *American Economic Review*, vol. IV, no. 1, p. 25, March, 1914, where the competitive theory of utility regulation is declared out of place at the present time and where the agency theory is supported. Professor Gray points out that the latter theory presupposes that all gains and losses are the principal's. This is the objection here raised to service-at-cost.

That service-at-cost franchises do set up this principal-agent relationship with the attendant dangers that have been pointed out, has been realized even by those who have been the chief sponsors of the movement. Therefore there have been various provisions inserted in some of the service-at-cost franchises looking to the prevention of inefficiency and the stimulation of efficiency. It is because these represent the chief effort on the part of American utilities and their regulators to pay attention to the nebulous question which forms the subject-matter of this whole treatise that we feel called upon to consider them at some length at this time. It is a corollary of the preceding statement that such experiments, for such they are as yet, are to be watched the more carefully because it is on them that we must rely as the chief source of material or experience from which to draw inductions as to the practicability of any scheme of special motivation. They are not necessarily peculiar to service-at-cost and may be said to be potentially applicable to other forms of special motivation.

[1] Of course there is the essential difference between "cost-plus" and service-at-cost that in the former case the "plus" of profit — including wages-of-management and interest on capital involved — is based on costs, while under service-at-cost the "plus" or fair return is based on the value of the property devoted to the public use. The tendency to "pad" the accounts is therefore decidedly checked in the latter case.

Analysis of Service-at-Cost Franchises

In order that a clear picture of these provisions may be obtained an analysis of all service-at-cost franchises now in operation (with the exception of the one in Findlay, Ohio, which is undergoing court review) is presented herewith in the form of a table, number XXIII, dealing first with certain general features which are necessary to an understanding of the more vital aspects summarized in the second part of the table. The analysis at this point will be limited to (1) the provisions for guarding against inefficiency and (2) those for promoting efficiency. The first of these two naturally breaks up into two parts. Efficiency, as the term is here used, embraces the quality of the service rendered and the cost of rendering that service. It will be well, therefore, to examine the devices used for protection against deterioration of service and those used to prevent unnecessary costs in rendering that service.

Provisions for Guarding against Inefficiency — Control of Service

Service-at-cost implies by its very name that the people who are served by a utility can demand any type of service they desire, provided they are willing to pay the costs incurred in rendering it. This is one of the happy features of the service-at-cost principle, since it removes one of the chief causes of friction between utility and public. As is seen from an examination of Table XXIII, service-at-cost franchises usually either specify, in more or less general terms, the type of service (and equipment, in the case of electric railways) desired, or else leave the establishment of service standards and regulations to the further action of the city council or, more directly of its representative, the local street railway administrator. Modifications from time to time also are made in this way. The Montreal

TABLE XXIII. (a) CERTAIN GENERAL ASPECTS OF SERVICE-AT-COST FRANCHISES

City (or state)	Date of enactment[1]	Term (years)	Control over						Other general features		
			Service and equipment	Extensions	Maintenance and depreciation	Return	Other forms of return	Accounting and reports	Special administrative agency	Rat[illegible]	"Barometer"
Cleveland	1909 1911 1919	25 (sec. 2)	City reserves to itself the entire control of service, subject to provision against impairment of earnings (sec. 9)	City may propose and shall be made if company can finance them, and if they will work no impairment of earnings (sec. 27)	Car-mile allowance for maintenance, depreciation and renewals set in act (sec. 19), subject to change (sec. 20)	5 per cent on bonded indebtedness (6 per cent maximum on refundments), and 6 per cent on remainder of capital value (sec. 16)	Excessive salaries provided against (sec. 25)	Accounting and monthly and other reports prescribed (sec. 15)	City Street Railroad Commissioner (sec. 10)	Graded (sec. 21)	"Interest fund" (secs. 18, 22)
Westerville Division, Columbus Railway, Power & Light Company	1917	25 (sec. 2)	Controlled by Commissioners (sec. 7)	Commissioners may order, subject to arbitration as to ability of company to finance or as to effect on stipulated return of company (sec. 14)	No specific provision for	In general, 6 per cent on initial value and 8 per cent on additional capital. For period of 10 years company waives return on one-fifth of initial value (secs. 10, 12)	Salaries controlled to some extent (sec. 13)	None	Board of County Commissioners and Street Railway Commissioner (secs. 7, 8, 18)	Graded (sec. 12)	"Working capital fund" (secs. 12, 13)
Dallas (electric railway)	1917	Indeterminate (sec. 38)	Controlled by Commissioners subject to arbitration (sec. 10)	Can be ordered by Commissioners, subject to arbitration (secs. 14, 27, 36)	Repair, maintenance and depreciation reserve established, subject to variations (sec. 22)	7 per cent, with certain increments dependent on rates charged, as explained elsewhere (sec. 23)	Salaries to be reasonable (sec. 28)	Monthly reports	Board of Commissioners and Supervisor of Public Utilities (sec. 11)	Graded (sec. 24)	"Surplus reserve" (sec. 22)
Massachusetts (general)	1918	Indeterminate	Controlled by Commission, subject to appeal (secs. 11, 14)	Commission can order, subject to appeal (secs. 11, 14)	Subject to Commission's order in each individual case	6 per cent on stock investment (sec. 2)	Certain contracts subject to approval (sec. 11)	Accounting prescribed; monthly reports (sec. 11)	Public Service Commission; three of directors of company to be appointed by governor (sec. 10); resident supervisor (one for each of 12 districts) (sec. 11)	Graded (sec. 6)	"Reserve fund" (secs. 3, 5)

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[1] A list of these ordinances appears in Appendix 2.

TABLE XXIII. (a) CERTAIN GENERAL ASPECTS OF SERVICE-AT-COST FRANCHISES (*continued*)

City (or state)	Date of enactment	Term (years)	Control over						Other general features		
			Service and equipment	Extensions	Maintenance and depreciation	Return	Other forms of return	Accounting and reports	Special administrative agency	Rates	"Barometer"
Boston (Boston Elevated Railway Company)	1918	Indeterminate	Under exclusive control of Board of Trustees (sec. 11)	Under exclusive control of Board of Trustees (sec. 2)	Subject to control of Board of Trustees (sec. 6). Property to be kept in "good operating condition" (sec. 12)	5 per cent on common stock, first two years; 5½ per cent, next two years: 6 per cent thereafter	..	..	Board of Trustees, appointed by governor, vested with exclusive and complete control of management of company (sec. 1)	Graded (sec. 7)	"Reserve fund" (sec. 5)
Eastern Massachusetts Street Railway Company	1918	10 (sec. 2)	Under control of Board of Trustees (sec. 11)	Under control of Board of Trustees (sec. 11), subject to approval of Board of Directors or to affirmation of Public Service Commission, with right of appeal (sec. 12)	Subject to control of Board of Trustees (sec. 14)	6 per cent on common stock	..	Prescribed	Board of Trustees, appointed by governor (secs. 11, 2); Public Service Commission of Massachusetts (now Department of Public Utilities)	Graded (sec. 15)	"Reserve fund" (secs. 16, 17)
Cincinnati	1918	28	Under control of city, subject to arbitration as to reasonableness (secs. 6, 8)	Can be ordered by city, subject to arbitration as to ability of company to finance (sec. 8)	Allowance for in budget. After five years state commission to fix depreciation allowance (sec. 22)	About 6 per cent on initial capital value (sec. 22)	Contracts for use or sale of power, etc., subject to approval of Director (sec. 8)	Under supervision of Director (sec. 8)	Director of Street Railroads (sec. 8)	Graded (sec. 20)	"Reserve fund" (sec. 22)
Youngstown	1918	25 (sec. 2)	City controls, subject to arbitration (secs. 6, 9)	Can be ordered by city, subject to arbitration as to ability of company to finance and if no impairment of earnings is worked (sec. 15)	Allowance fixed in grant on car-mile basis, subject to change (secs. 10, 11, 12)	7 per cent on initial value; new capital, lowest rate at which obtainable (sec. 10–E)	Salaries paid by company subject to approval of Commissioner (sec. 11)	Accounting prescribed (sec. 7); monthly reports	Street Railroad Commissioner (sec. 8)	Graded (sec. 14)	"Stabilizing fund" (sec. 13)

TABLE XXIII. (a) CERTAIN GENERAL ASPECTS OF SERVICE-AT-COST FRANCHISES (*continued*)

City (or state)	Date of enactment	Term (years)	Control over						Other general features		
			Service and equipment	Extensions	Maintenance and depreciation	Return	Other forms of return	Accounting and reports	Special administrative agency	Rates	"Barometer"
Montreal	1918	35 (art. 24	Under control of Tramways Commission. Car density fixed yearly (arts. 54–64, 83, 92, etc.)	Subject to Tramways Commission, subject to question as to ability of company to finance, etc. (arts. 33–35)	Maintenance allowance on car-mile basis fixed each year by Tramways Commission (art. 92)	6 per cent; 7 per cent on new capital supplied during war and for a period of five years after end of war (art. 92)	All contracts involving over $50,000 subject to approval of Tramways Commission (art. 71)	Annual report (arts. 19, 92)	Montreal Tramways Commission (art. 2); appeal to Quebec Public Utilities Commission (arts. 15, 20)	Graded (arts. 76, 83)	"Contingent fund" and "tolls reduction fund" (art. 92)
Rochester	1920	10 (art. 18)	Under control of city, subject to provision against impairment of earnings (art. 3)	City can order, subject to provision against impairment of property (arts. 3 and 8)	Depreciation reserve established (art. 7)	Varies with fare charged, minimum 6 per cent, as explained elsewhere (art. 6)	Excessive salaries and wages guarded against and all contracts for equipment, material, etc., subject to approval (art. 3)	Accounting prescribed (art. 3)	Commissioner of Street Railroads (art. 3)	Graded (art. 5)	"Balancing fund" (art. 5)
Memphis	1920	Indeterminate	Controlled by Commission; standard (minimum and maximum) fixed in order, subject to change (p. 4)	No specific provision	Renewal and replacement reserve prescribed in order (p. 4)	6½ to 7½ per cent, depending on condition of fare index fund, as explained elsewhere (p. 5)	None	Accounting prescribed (p. 4); monthly and special reports required (p. 7)	Railroad and Public Utilities Commission of Tennessee. A supervisor, not provided for in order, is employed jointly by city and company	Graded (p. 6)	"Fare index fund" (p. 6)
Toledo	1920	25 (sec. 2)	Under control of city, subject to provision against impairment of earnings (sec. 14)	City can order, subject to arbitration as to ability of company to finance and as to impairment of earnings (sec. 29)	Maintenance and repair fund to be fixed yearly by Commissioner (sec. 21); depreciation fund likewise, within certain limits (sec. 22)	6 per cent on bonds and 8 per cent on preferred stock (sec. 7)	Electric power rates and salaries to be reasonable (secs. 11, 41)	Accounting prescribed; monthly and annual reports (sec. 17)	Board of Street Railway Commissioners (sec. 8): Street Railway Commissioner (sec. 9)	Graded (secs. 26, 27)	"Stabilizing fund" (sec. 19)

TABLE XXIII. (a) CERTAIN GENERAL ASPECTS OF SERVICE-AT-COST FRANCHISES (*continued*)

City (or state)	Date of enactment	Term (years)	Control over						Other general features		
			Service and equipment	Extensions	Maintenance and depreciation	Return	Other forms of return	Accounting and reports	Special administrative agency	Rates	"Barometer"
Des Moines	1921	25 (sec. 2)	Under control of two supervisors, subject to arbitration (sec. 7)	City can order, subject to provision against impairment of earning power sec. 6)	General requirement only (sec. 23)	7 per cent on preferred stock; rate on common stock varies with fare charged, as explained elsewhere (sec. 17)	Salaries of officers subject to scrutiny (sec. 24)	Monthly and other reports (secs. 18, 21)	Two supervisors, one appointed by city and one by company (sec. 14)	Graded (sec. 16)	"Fare adjustment fund" (sec. 16)
Dallas (light and power)	1917	Indeterminate	City can prescribe (secs. 8, 9)	City can order, subject to arbitration (sec. 25)	Maintenance and depreciation reserve prescribed (sec. 22)	7 per cent, with increase for reduction of rates, as explained elsewhere (sec. 22)	Salaries to be reasonable (sec. 27)	Monthly report (sec. 12)	Supervisor of Public Utilities and Board of Commissioners (sec. 11)	Graded (sec. 23)	"Surplus reserve" (sec. 21)
Ann Arbor (gas)	1918	25 (p. 9)	City can prescribe	No specific provision	Renewal and replacement fund provided (p. 25)	5 per cent, subject to change (p. 15), with increment in return for reduction in rates charged, as explained elsewhere (pp. 15, 17, 26)	No officer or employee to receive salary in excess of 2½ per cent of issued capital stock (p. 25)	Annual report	City Council; special local commission; Public Utilities Commission of Michigan (p. 1)	Graded (pp. 16, 19)	No specific provision; rate changes can be made by company in anticipation of needs and yield

TABLE XXIII. (b) EFFICIENCY PROVISIONS IN SERVICE-AT-COST FRANCHISES (*continued*)

City (or state)	Special incentive to efficiency	Special provision against inefficiency
Cleveland	None	Street Railroad Commissioner to report any laxity and inefficiency in management and to suggest improvements (sec. 30); car mileage allowance for operating expenses and for maintenance, depreciation and renewals, to be fixed yearly by Commissioner (secs. 19, 20)
Westerville Division, Columbus Railway, Power [illegible] Light Company	None	None
Dallas (electric railway)	Basic return of 7 per cent increased to 8 per cent if fares are reduced to next lower stage, and ½ of 1 per cent further increases in return for each successive reduction of fares (sec. 23)	Supervisor to report wastefulness in purchasing material or employment of labor (sec. 29); repair, maintenance and depreciation reserve established (sec. 22)
Massachusetts (general)	None	Resident supervisors to report inadequate service, etc.; Commission may make changes in management or operation of company where "necessary for the efficient conduct of the business . . . in the interest of the public" (sec. 11)
Boston (Boston Elevated Railway Company)	None	Board of Trustees in active charge of management (sec. 2)
Eastern Massachusetts Street Railway Company	None	Board of Trustees in active charge of management (secs. 2, 11)
Cincinnati	Company's share of "surplus receipts" increases [illegible] rates of fare are reduced. If fare is over [illegible] cents, company's share is 0 per cent; if 6 cents, 20 per cent; if 5½ cents, 30 per cent; if 5 cents, 45 per cent (sec. 22)	Director of Street Railroads to keep informed as to cost and quality of service. An annual budget of expenditures, drawn up by company and not to be departed from except with consent of Director

TABLE XXIII. (b) EFFICIENCY PROVISIONS IN SERVICE-AT-COST FRANCHISES (*continued*)

<table>
<tr><th>City
(or state)</th><th>Special incentive to efficiency</th><th>Special provision against inefficiency</th></tr>
<tr><td>Youngstown</td><td>None</td><td>Street Railroad Commissioner to see that proper economy in the purchase and use of material and in the compensation of employees is observed (sec. 14). Operating and maintenance allowance on car-mile basis fixed by Commissioner (sec. 12)</td></tr>
<tr><td>Montreal</td><td>Operating profit of ½ of 1 per cent allowed if company keeps within 102½ per cent of operating allowance or if excess over operating allowance is, in opinion of Tramways Commission, unavoidable. If avoidable, excess comes out of operating profit or company's return. "Divisible surplus" is divided 30 per cent to city, 20 per cent to company, and 50 per cent to tolls reduction fund (art. 92)</td><td>Operating and maintenance allowances fixed each year by Tramways Commission; if company exceeds these allowances by 2½ per cent and is not excused by Tramways Commission, excess comes out of company's return (art. 92)</td></tr>
<tr><td>Rochester</td><td>Rate of return on base value varies indirectly with rate of fares charged, as follows:
<table>
<tr><th>Rate of fare
(cents)</th><th>Rate of return
(per cent)</th></tr>
<tr><td>3</td><td>8</td></tr>
<tr><td>4</td><td>7.5</td></tr>
<tr><td>5</td><td>7</td></tr>
<tr><td>6</td><td>6.5</td></tr>
<tr><td>7</td><td>6</td></tr>
<tr><td>8–10</td><td>6</td></tr>
</table>
(art. 6)</td><td>None</td></tr>
<tr><td>Memphis</td><td>Rate of return varies directly with condition of fare index fund. Minimum rate, 6½ per cent; if fare index fund is in excess of $60,000 during any month, return may be at any rate between 6½ and 7½ per cent which the company may be able to pay out of the current revenues of the month after meeting all other specified charges. Minimum return is cumulative (p. 5)</td><td>No specific provision, other than for a special traffic survey to improve operation of the property</td></tr>
<tr><td>Toledo</td><td>None</td><td>Street Railway Commissioner to report any wastefulness or inefficiency in purchase or use of material or employment of labor; appeal to arbitration and penalty for noncompliance with findings (sec. 11)</td></tr>
</table>

TABLE XXIII. (b) EFFICIENCY PROVISIONS IN SERVICE-AT-COST FRANCHISES (*continued*)

<table>
<tr><th>City</th><th>Special incentive to efficiency</th><th>Special provision against inefficiency</th></tr>
<tr><td>Des Moines</td><td>Rate of return payable on common stock varies inversely with rate of fare charged, as follows:
<table>
<tr><th>Rate of fare (cents)</th><th>Rate of return (per cent)</th></tr>
<tr><td>Over 7</td><td>0</td></tr>
<tr><td>7</td><td>3</td></tr>
<tr><td>6</td><td>4½</td></tr>
<tr><td>5</td><td>6</td></tr>
<tr><td>Under 5</td><td>7</td></tr>
</table>
(sec. 17)</td><td>None</td></tr>
<tr><td>Dallas (light and power)</td><td>Rate of return, fixed at 7 per cent, may be increased by ½ or ¼ per cent by reduction in rates charged public</td><td>Supervisor to report wastefulness and inefficiency and to suggest improvements (sec. 27); also to assist company in reducing its load factor and unit costs (sec. 23); maintenance and depreciation reserves prescribed (sec. 22)</td></tr>
<tr><td>Ann Arbor (gas)</td><td>Company's share of surplus profits to be divided with consumers on the following basis (as amended):
<table>
<tr><th colspan="2">When rates are (cents)</th><th colspan="2">Division of profit (per cent)</th></tr>
<tr><th>Primary</th><th>Secondary</th><th>To company</th><th>To consumer</th></tr>
<tr><td>145</td><td>125</td><td>0</td><td>100</td></tr>
<tr><td>140</td><td>120</td><td>10</td><td>90</td></tr>
<tr><td>135</td><td>115</td><td>20</td><td>80</td></tr>
<tr><td>130</td><td>110</td><td>30</td><td>70</td></tr>
<tr><td>125</td><td>105</td><td>40</td><td>60</td></tr>
<tr><td>120</td><td>100</td><td>50</td><td>50</td></tr>
<tr><td>115</td><td>95</td><td>60</td><td>40</td></tr>
<tr><td>110</td><td>90</td><td>70</td><td>30</td></tr>
<tr><td>105</td><td>85</td><td>80</td><td>20</td></tr>
<tr><td>100</td><td>80</td><td>90</td><td>10</td></tr>
<tr><td>95</td><td>75</td><td>100</td><td>0</td></tr>
</table></td><td>None</td></tr>
</table>

franchise provides specifically for a yearly determination of the essential elements of good electric railway service, especially car density, and the recently enacted Memphis service-at-cost order provides that the company shall provide, during each month, not less than 0.155 nor more than 0.185 passenger car-miles for each revenue passenger carried. The latter provision is interesting as an example of the establishing of a limitation upon the maximum service which the company may furnish. The exact figures given are subject to change from time to time.

Since the raising of the service standards usually entails an increase in costs and thereby to a degree jeopardizes the return to which the utility is entitled, complaint is often made by the utility that such requirements are unreasonable. In the Cincinnati ordinance, for example, it is provided that the company may object to the orders of the city or the Street Railroad Commissioner on the ground that it is not able to comply with them and yet perform its corporate obligations, maintain its organization and perform the duties imposed by the grant. In the majority of the cases an appeal to a board of arbitration is provided for and in the remaining cases appeal to the state commission or to the courts may usually be made in the regular manner. In the Chicago franchises and the cases of the Boston Elevated Railway and Eastern Massachusetts Railway companies the decisions of the public authorities are more conclusive. In other words, the entire management, practically, is turned over to them and they are confronted with the task of reconciling the clamors of the public for more service on the one hand with the claims of the property for earning power on the other.[1]

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[1] The similarity of this arrangement to the kind of control exercised by a receiver is to be noted. In fact, it may be said that the two boards of public trustees are functioning practically as receivers with the result that the close managerial control which goes with receivership control is here substituted for the general control which characterizes commission regulation.

The mere prescription of standards, such as the frequency, speed or safety of car service, the voltage regularity of electricity or the heating power and pressure of gas, is no assurance that the utility will meet them at all times. Therefore machinery must be provided for checking up the quality of the service. Such inspection has become quite an elaborate process in the case of electric railways and is equally effective, although less conspicuous, perhaps, in the case of gas and electric service. The various service-at-cost franchises analyzed in Table XXIII contain provisions for such checks, usually in the form of a requirement that the local administrative agency shall maintain a close supervision of the day to day operation of the property and call both the utility's and the city council's attention to any lapses from the duly established service standards, require their removal, and take action looking to the imposing of a penalty or forfeiture in case of continued non-compliance with the requirements.

A particular phase of the question of quality of service is the matter of securing extensions into outlying territory. This is not the place for a full discussion of this matter. It would seem, though, that service-at-cost franchises provide means for more amicable settlement of disputes over extensions than the usual form of regulation, since the making of extensions which are temporarily unprofitable entails costs which it is readily seen must be borne by the whole body of users of the utility's service, and unreasonable demand will be less likely to be made. Usually the city's right to require extensions and improvements and to inspect and approve plans for carrying them out is provided for in the service-at-cost franchises. Cleveland has learned that the failure to provide adequately for such control over extensions is a source of considerable annoyance and inconvenience. In most cases the provision covering extensions and improvements is subject to the condition that the company may appeal to a board of arbitration on the ground that such extensions are unreasonable, embarrass its earning power, or cannot be financed with a reasonable outlay of money. There has been no opportunity to test this feature of service-at-cost franchises under normal conditions, since utilities have, until very recently, found it difficult to obtain the additional capital needed. Since, however, under normal conditions a utility company is naturally desirous of expanding, and since, normally, such adding to its property would not endanger but add security to its own property, there can be no serious doubt but that extensions will, under service-at-cost franchises, be more readily acquiesced in by the company than they are under other forms of regulation. The difficulty of late has been that of obtaining new funds at the rates permitted by the franchise. This situation is righting itself, however.

It can, then, be said by way of conclusion that service is better controlled and, with proper surpervision, need give rise to fewer complaints under service-at-cost franchises than under the customary form of regulation. If the city does not get the kind of service it desires under a service-at-cost franchise it is because it is not vigilant enough or else because conditions beyond the control of utility and city alike, chiefly increased costs, make it impossible for the city to insist on a strictly literal compliance with the requirements.

Control of Cost of Rendering Service

A somewhat more vital phase of this analysis has to do with the prevention of inefficiency in the management of utility enterprises operating under service-at-cost franchises. Reference here is to the cost aspect of efficiency.

Inefficiency in this respect may take on any of a number of aspects. Mention has already been made of the general let-down in interest in minute savings consequent upon the transfer of the enterprise from the domain of private economy to the domain of public economy which the agency theory of regulation involves. One form in which this shows itself is in the purchase of materials and supplies. That close bargaining which is necessarily associated with successful private enterprise is lacking. Again, materials may be used carelessly. But more particularly the chief source of unnecessary expenditures is found in the way in which the labor element is handled. This is true partly because labor expense constitutes so much larger a percentage of the total expenses of public utilities than is the case with many other types of business, but more particularly because in the employment of labor peculiar difficulties are encountered (human prejudices, labor union activities, the rise to a place of advantage in bargaining power which unskilled and semi-skilled labor has recently experienced) which call for a higher order of administrative skill than does the handling of materials, at least at this late date when the engineering features of utility operation are quite maturely developed. It is more difficult to hold out against a demand for an increase in wages or an improvement of working conditions when the public and not the utility's stockholders must pay the bill. The granting of necessary increases in wages is, of course, not to be considered an indication of inefficiency in the administration of the affairs of a utility. But the granting of unnecessary increases and the improper supervision of labor are very clear indications of indifferent management. It is solely to these latter that reference is here made.[1]

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[1] The fears to which expression is here given are attested to in the following quotation from an article by W. C. Culkins, Director of Street Railroads at Cincinnati:

"The first and most important of these objections is that the fixing of a definite and rigid return on the investment destroys all incentive for the officers of the company to exercise efficiency and introduce economies in the operation of the property. Stockholders think in terms of dividends, and as long as these are produced at the maximum officials need have no fear of removal. Carlyle has said 'Every man is as lazy as he dare be,' and electric railway executives are no exception to this rule. There may be a

Another very important though not so obvious source of inefficiency is the skimping of maintenance. A capital value, or its equivalent under another name, is necessarily established when any utility is brought under a service-at-cost arrangement. Provisions are made in the usual manner for writing this initial value up or down according as capital expenditures are made or assets are consumed without replacement. If the railway company can, through skimping maintenance, decrease the rate of fare or postpone a fare increase and thereby secure the higher rate of return which, in some franchises, is stipulated to go with the lower rates of fare, even though it is thereby endangering its own future, it will be tempted to do so. Proper service is impossible with an inadequately maintained plant.

So much, then, for possible sources of wastefulness and other forms of inefficiency. A general requirement is found in some acts, as Dallas and Montreal, to the effect that the utility shall "keep all its property in good and businesslike order and repair" and that "new types of equipment . . . be introduced to supersede those that become antiquated or obsolete according to commonly accepted commercial standards in the business." But obviously these requirements are much too general to be of much practical value. There is need, therefore, for specific provisions that will make inefficiency in any of its forms impossible. Some such are found. Thus, in Table XXIII it is seen that in ten cases the act itself prescribes the amount — sometimes a minimum percentage of gross revenue, at other times in the form of a budget or car-mile allowance — which must be set aside from operating revenues to meet the costs

very natural tendency to yield to the exorbitant demands of employees, to be listless in making purchases, and in general to pass the buck to the city authorities in the matter of service requirements. Thus the city will be deprived of the keen coöperation of the trained and experienced executives of the company, which is so necessary to the successful operation of the plan." (*Electric Railway Journal*, July 12, 1919, p. 79.)

which wear and tear and replacement involve. In Massachusetts and Ann Arbor the determination of the exact amount is left to some disinterested agency.

The service-at-cost franchise voted down in Denver in 1919 provided that capital expenditures in any one year in excess of one half of one per cent of the stipulated fair value of the company's property, and any increase greater than three per cent in operating expenses over those for the preceding year, must be approved by the Board of Tramway Commissioners before being allowed as a cost of the service. Such provisions are of value only if future conditions can be anticipated with reasonable accuracy. They have the merit, however, of directing attention to the necessity of keeping expenditures at a minimum and of putting the burden of proof on the company.

Supervisory Work of Local Street Railway Commissioner

A somewhat promising check upon the tendency to laxity and inefficiency is found in the activities of the special administrative agency created to protect the interests of the city and, to be sure, those of the utility. Sometimes, as in the Chicago franchises, this agency is relied upon for very extensive and thoroughgoing attention to the technical and financial or business problems of the utility. The Board of Supervising Engineers, Chicago Traction, manned by highly capable engineers and other experts, completely rehabilitated the roads. In other places the single commissioner may be able to do much valuable constructive work, but the multitude of his duties usually requires that the most urgent matters be attended to first. Broad matters of policy tend, therefore, to be pushed aside by the practical day to day work of his office. This statement does not apply, of course, in all places. In Dallas are found the peculiar provisions that the Supervisor of Public Utilities is to do all he can to improve the load factors of the electric company and to reduce its unit costs.

In connection with such and similar provisions it should be borne in mind that, as a general rule, public officials are relatively less capable than those trained to advance to the most important posts in the utility organizations themselves.

More commonly, then, the special contribution of the supervising agency is criticism. In more than half of the cases provision is made for the supervisors' watching for, examining and reporting on any indications of inefficiency. Thus in Cleveland "he shall always keep informed as to all matters affecting the cost or quality of the service furnished"; in the Massachusetts general service-at-cost act it is provided that the resident supervisor shall "keep in constant touch with the operations of the companies and ... inform the commission of all complaints and criticism of the service rendered"; in Youngstown the commissioner is to see that methods of fare collection are efficient and that proper economy in the purchase of materials and compensation of employees is observed. Similar provisions are found in other franchises. The Boston Elevated and Eastern Massachusetts acts, by putting the boards of trustees in complete control of the management of the properties, put the entire onus on their shoulders. This situation is, of course, unusual. Provision is also found in the Massachusetts general service-at-cost act to the effect that the Public Service Commission may make any changes in the personnel of the management where "necessary for the efficient conduct of the business of the company in the interest of the public." This act, as well as the Chicago acts, provides for the Commission's making direct changes in methods of operation. Nearly all of the acts require the rendering of reports, sometimes monthly, sometimes annually, to the commissioner, and give him access to the utilities' books and power to *visé* such documents as should come to his attention. Sometimes he can prescribe the accounting usages and in other cases the act itself does so. Audits also are provided for in nearly all cases. It is essential that all records be thus open for public observation if complete public confidence is to be won for service-at-cost and if the local commissioner is to have the complete information that he requires.

More promising than these provisions are those looking to the establishing, from time to time, usually at yearly intervals, of allowances for operating expenses, including maintenance and renewals. In some instances, as in Cincinnati and the defeated Minneapolis ordinance, there is a budget drawn up, each year in advance, by the company for the approval of the city commissioner. In this budget are set up the amounts which it is expected will be required for each of the elements of cost of service. If the company exceeds such expenditures it must meet the excess out of its own return, unless the excess is excused by the commissioner. In other cases the allowance is on a car-mile basis, as in Cleveland, Youngstown, and Montreal, with similar penalties for exceeding the allowances. Inasmuch as this device may also be looked upon as a means of stimulating efficiency, it is discussed at greater length at a subsequent point.

It is difficult to foretell the effect which such supervision is going to have on the maintenance of a high standard of efficiency in utility operation. The success or failure of service-at-cost depends in very large measure on the integrity, ability, and energy of the local supervisory official. Dr. Delos F. Wilcox, an ardent advocate of local regulation of utilities and of municipal ownership, has said very aptly:

> To make a service-at-cost plan effective under private management requires a persistent application of public intelligence and public will that is just as difficult as efficiency in direct public operation.[1]

The functions of these city commissioners are so varied, requiring as they do technical operating and engineering knowledge, financial and legal experience, tact and a capacity for a kind of civic leadership, that it will be with difficulty that suitable selections can be made. The selections bid fair to be strong ones at first, but it is doubtful whether this standard can be maintained over a stretch of years. Politics should be eliminated so far as possible as a factor in the situation. There should be a complete concentration of responsibility in the hands of the commissioner and he should be held strictly to account for results. His salary should be liberal and ample assistance should be provided that a thoroughgoing, far-sighted program may be developed. Lack of coöperation on the part of either the company or the public nullifies the scheme, as appears to have been the result in at least one community. The accomplishments of this body of men, pioneers as they are in a way, should be closely watched. Much of value will undoubtedly come from their early experiences. In many respects this type is similar to the city manager type, both comprising breadth of duties with technical training. The Montreal act provides for a Tramways Commission of three members, appointed for a period of ten years. Such a body of men can divide their work according to their respective capacities and interests. The advantage of this division of labor is considerable. Much is to be said for the thoroughgoing way in which the problem is being handled in Montreal.[1]

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[1] *Electric Railway Journal*, June 21, 1919.

Provisions for promoting Efficiency

We may pass now to those provisions found in service-at-cost franchises which look to the positive stimulation of efficiency. It is to these that particular reference has been made from time to time. Enough has already been said to show that there is special need for provisions of this sort. The fixity of the rate of return,[1] the practical guarantee that, under normal conditions, it will be earned and payable, and the fact that all costs are borne by the public, are the essential elements out of which this need arises.

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[1] An association has been formed by the American commissioners, originally known as The American Association of City Representatives of Electric Railways, but now known as Public Representatives of Urban Transit. This association provides a means of exchanging experiences, developing a technique, and of furnishing a healthful rivalry.

These special provisions usually take one of four forms: (1) a simple division of "surplus profits" between the utility and the city; (2) an allowance of an increased rate of return or an increased share of "surplus profits" with a decrease in the rates charged the public; (3) an operating profit; and (4) an operating allowance or budget in one form or another. Before taking up these provisions two preliminary observations may be made.

Certain Controlling Principles

Any devices of the kinds mentioned, to be successful, must be certain of operation. Any promised reward must be a certain reward, not subject to circumvention through some unforeseeable demand on the part of the public or through some capricious interpretation of the terms of the franchise. Reward or punishment must be certain to follow or the purpose of such provisions is defeated.

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[1] It is of interest to note the rate of return allowed in the service-at-cost franchises analyzed above. The Chicago ordinances provided for a basic five per cent return on the price which the city would have to pay at any time for the properties; the Cleveland act provides for a five per cent return on the funded debt and six per cent on the remainder of the capital; so recent an act as the Ann Arbor franchise provides only five per cent on the agreed valuation (considerably more than five per cent on the capital stock) "since the plan . . . eliminates in great measure the risks of the investment." This rate has subsequently been raised owing to the higher rate at which certain securities were refunded. The Boston Elevated act provides a six per cent return (five per cent for first two years, five and one half per cent for next two years); the general Massachusetts act provides for a six per cent return on stock investment and the Eastern Massachusetts Railway act six per cent also, as do the Kansas City act and the Cincinnati act, practically. The Montreal act stipulates six per cent (except for new capital furnished during the war, as to which for a maximum period of five years after termination of the war it is seven per cent); the Westerville grant provides a six per cent return on agreed valuation and eight per cent on new capital with a special return of fifteen per cent on new capital invested in one particular locality; in Youngstown it is seven per cent. The tendency seems to be the same here as that which was found in the case of the allowances of state commissions, viz., to make a somewhat larger allowance in the later agreements, owing, no doubt, to the increasing rates demanded upon capital awaiting investment.

Again, if the stimulation to efficiency is to come about through one (or more) of the above devices, it must be the *sole* source of extra return. The truth of this remark was brought out in the discussion of the sliding scale system of regulation. In many cases, as in Chicago, Cleveland, Dallas, and Youngstown, specific provision is made for public scrutiny of the salaries paid officials and employees of the utilities; in Ann Arbor it is provided that no official or employee shall receive yearly remuneration at a rate in excess of the equivalent of 2½ per cent of the issued capital. Again, in many cases, as Cleveland, Cincinnati, and the Massachusetts general act, all important contracts must be approved by the regulating agency, and in nearly every case contracts involving payments for construction are subject to such a *visé*. The Cleveland act provides that bonds are to be sold at the best price obtainable; a similar provision is found in the Youngstown franchise; in Cincinnati the Director of Street Railroads must first approve of the terms of sale of new securities. The Montreal act provides a fund of $180,000 per year to be used to cover necessary discounts on new capital issues. These, then, are some of the ways in which the procurement of unintended profits is circumvented. It cannot, unfortunately, be concluded that adequate protection against the utility's receiving unintended earnings is afforded by such provisions as these. If utility operation is to be put on a nonspeculative basis a wholesale change in present-day methods of utility financing and the control of utility financing will have to take place. Of such a change there is slight prospect at the present time.

Division of "Surplus Profits"

The earliest of the methods for stimulating efficiency is the division of "surplus profits" between the utility and the city in some predetermined manner. The idea behind such an arrangement is the simple one that a management will exert itself more and act more shrewdly and carefully if it can see that doing so will result in its receiving some pecuniary reward. Whether such will be the effect can better be judged after a brief examination of the provisions themselves.

In Chicago the companies (later company) may keep forty-five per cent of all "net receipts." Net receipts constitute the remainder left after paying all operating expenses, taxes, and the stipulated five per cent return. In Kansas City, after $6,300,000 has been accumulated for extensions, the company may keep one third of the "surplus income." The Montreal franchise provides for the division of the "divisible surplus" thirty per cent to the city, twenty per cent to the company, and fifty per cent to the tolls reduction fund.[1] These various provisions are hereinafter referred to as the Chicago plan.

This plan undoubtedly has certain merits. It does give the utility some interest in the keeping of costs down and efficiency up. How stimulating a factor this will be in an instant case depends, from the company's point of view, on the possibilities that exist of earning an appreciable surplus and of retaining a share thereof over a period of years. From the public's point of view the question resolves itself into whether there is any causal relationship between the activities of the company and the amount of surplus for distribution. The number of causes contributing to the increased efficiency of the Chicago transportation system is such that no single one's particular effect can be ascertained. Certainly a great deal of the credit for this improvement is due to the Board of Supervising Engineers. An examination of the first eight annual reports of the Board shows that the total earnings of the companies (later company) have been as follows, expressed as per cent on capital value:

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[1] A reserve which when it amounts to $1,000,000 may lead to a reduction in rates by the Commission; when it amounts to $2,500,000 such a reduction must be made.

Year	Rate per cent	Year	Rate per cent
1907	7.28	1911	6.82
1908	6.04	1912	6.54
1909	6.13	1913	6.78
1910	5.58	1914	6.47

No conclusions can be drawn from these figures, however, since they represent in large measure the results of causes beyond the control of the management. There is no "barometer" device or system of graded fares and so increased costs work their full effect directly on the return. Aside from this feature, the chief objection to this method is that it fails to align completely the interests of the company and those of the city, inasmuch as the creation of a surplus may be made possible through neglected maintenance or lowering of the standard of service — results which cannot entirely be checked by the Board of Supervising Engineers — or by the charging of higher rates than are necessary. In other words, there is no direct inducement to keep fares down while there is a great temptation to neglect legitimate costs. The Montreal franchise, which embraces this simple division of surplus, has, however, two other devices which check such a tendency, as will be seen presently. The provisions of the Chicago ordinances have, no doubt, allayed some of the suspicion of exploitation which attaches to any public utility business. Whether they have done more than this it is impossible to say. It is to be noted that none of the service-at-cost franchises adopted since 1914, with the exception of the

Montreal franchise, have made use of this device and that the new traction ordinance passed by the Chicago city council over the mayor's veto on August 22, 1918, and later rejected by a referendum vote, did not contain a provision of this type but one of a type more commonly found in recent service-at-cost franchises.

Increased Return to Company for Reduction of Rates charged Public

The second of the devices for stimulating efficiency, while taking several forms, is essentially the allowance of an increased return to the company for a reduction in the rates charged the public. The form which this increased return takes is not of material consequence. In the two Dallas ordinances and the Rochester ordinance the "profit" or reward for efficiency accruing to the company takes the form of an increased percentage return on the stipulated value; the same is true of the Des Moines franchise except that this increase is applicable only to the common stock, the preferred stock receiving a fixed return of 7 per cent. In Cincinnati and Ann Arbor, on the other hand, the company receives an increased share of "surplus receipts" or "surplus profits" with a decrease of rates. These two types are not fundamentally different in principle, looked at over a period of years. The chief difference between them consists of the fact that there is slightly greater opportunity for unexpected, in a sense speculative, profits under the division of surplus scheme. But close supervision and the leveling effects of years probably would offset the temporary advantage to a company of this method. In Memphis the increase in the rate of return allowed the company varies directly with the size of the fare index fund. The apparent inconsistency between this device and the others described will be explained presently. All of these devices are described in more detail in Table XXIII.

These several devices have a familiar air about them. Many of their elements are similar to those found in the sliding scale device. In fact all of the devices for special motivation discussed in this chapter are simply different castings up of the same essential elements. The fundamental difference between the service-at-cost device and the sliding scale is, however, to be found in the fact that in service-at-cost the increased return or reward for efficiency is an addition to a practically assured basic return, which, under normal conditions, will always be paid to the company, while under sliding scale events may so develop as to deprive the company of a reasonable, a moderate, or even of any return at all. Service-at-cost furnishes the "positive stimulus" of getting more than an assured return; sliding scale furnishes the "positive stimulus" of getting more than the usual return with the added "negative stimulus" of losing even the usual return. As already pointed out, these "negative stimuli" have nearly done the sliding scale companies in England to death in the face of greatly increased costs. While recognizing the immorality and unwisdom of compelling a company which has kept the faith to operate at a loss, as a practical matter, if some contingent protection against loss could be made without doing away with that strong stimulant, the fear of loss, we should have an ideal combination of stimuli. Perhaps such a combination is possible; we shall see later.

The ordinances of the Dallas and Rochester type mark some advance over those of the Chicago type. Since the rate of fare charged the public determines the amount of increment of return, and since a low rate of fare cannot, in these high cost days, be charged unless close attention is paid to costs, the company is given an inducement for keeping costs down. The interests of the public and the utility are, so far as these provisions are concerned, one: the company desires low fares and therefore is moved to keep costs down; the city desires low fares and is willing to compensate the company in some measure for its efforts to make them possible.

The difficulties which such devices present are, nevertheless, serious. The guaranteed minimum return of not less than six per cent and rising as high as seven per cent may be considered by some companies to furnish a sufficient return; the bait of increased return may be sniffed aside. This argument is especially compelling when the distant future is reckoned with. More persuasive at the present time is the thought that economic conditions may be such as to prevent the company, however stimulated and however efficient, from lowering fares and receiving its share of the benefits thereof. Such conditions exist to a large extent at the present time and many of the devices here discussed for this reason are inoperative.[1]

Other objections which make it impossible to predict entire success for such devices arise from the fact that it is practically impossible, in a franchise with a life of twenty-five years or more, or even in one of ten years' duration, to predict the future and take into account factors which are beyond the control of the management. These factors may in some instances work against the interests of the company, as indicated above, and in other instances against the interests of the public. For example, a decrease in the general price level would enable a company to make reductions in rates of fare and therefore to receive a larger return itself. Or this same result may be produced by a general growth of the community or by other like causes to which the management, by the nature of things, can contribute little. Since these objections have been fully canvassed in the preceding treatment of sliding scale it is not necessary to repeat them in detail here.

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[1] Thus in Ann Arbor, while operation for the year 1918 was quite satisfactory and the company was able at the end of the year to return to its customers about $6\frac{1}{4}$ per cent of their gas bills for the year, in the succeeding year the local coke market went to pieces, revenues declined, no return was made to the users and a revision of rates was necessitated. This information has kindly been furnished by Professor H. E. Riggs, one of the three commissioners by whom the plan was drawn up.

What has been said applies in all respects to the Cincinnati and Ann Arbor franchises. The Cincinnati franchise, indeed, sets up what will doubtless always prove to be an opposition of the forces working for and against the stimulation of the management to extra efforts. These contrary forces are, on the one hand, the desire of the company to create as large a "surplus reserve" as possible and, on the other hand, to keep the fares as low as possible. But, normally, the amount of surplus reserve and the rates of fare vary directly, one with the other. Therefore if the company strives to create a large surplus for distribution it must, normally, charge rates of fare which will lower its share of the surplus.[1] The local commission which drew up the Ann Arbor franchise recognized that the company would constantly be balancing in its mind the relative amounts which it would obtain as its share of the surplus under (a) a reduced rate with an increase in the percentage of the surplus it would receive but with a reduction in the amount of the surplus available, and (b) the same rate with a smaller percentage of the surplus than it would get if the rates were reduced but with more dollars to divide. The commission realized that the company would naturally seek to obtain the maximum net income and so set up an equation which when differentiated and the first derivative equated to zero will give the condition under which the company will receive the maximum net return. This equation marks a development in the technique of utility regulation.

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[1] No adequate statistics of variation in the riding habit with variation in rates of fares have been developed. The point has been made, however, earlier in this chapter, that increased fares, up to a certain maximum, usually yield an increase in gross receipts which more than compensates for a decline in the number of passengers carried. In the case of gas it is likely that the limits within which rates may vary without resulting in an appreciable variation in the consumption is even greater, owing to the fact that users of gas, like the largest part of the street car riders, use no more service at any price, however low, than is absolutely required and to cut below this is impossible.

It is to be noted that no special pecuniary reward for extra endeavor is made a part of the Cleveland, Westerville, Youngstown, and Toledo ordinances or the three Massachusetts acts. Mr. Fielder Sanders, Street Railway Commissioner of Cleveland, stated before the Federal Electric Railways Commission that when the act was under consideration the city was opposed to the including of such a provision "on the ground that the company would skimp in the interest of stockholders and in the long run injure them, and the company objected that the city would show a tendency to reduce the annual operating allowance by the amount of the company's savings in the prior year." [1] The Youngstown and Toledo acts are closely modeled after the Cleveland act. It is to be borne in mind that the local political situation may be such as to make it impracticable to suggest the use of such devices. Of the three Massachusetts acts two call for public operation and therefore make any such extra financial return out of place.[2]

Operating Profit

The third of the devices which were mentioned above was an "operating profit." The only franchise in which such a device is found is the highly developed Montreal franchise. Reference had already been made to the division of the "divisible surplus" between the utility, the city, and the tolls reduction fund. Reference here is to something different from this. The Montreal franchise provides for the setting each year by the Tramways Commission of an operating allowance, expressed in cents per car-mile. If the company keeps within this allowance or exceeds it by not more than two and one half per cent, it is allowed an extra one eighth of one per cent on the average capital value for the year. This extra return is known as the operating profit. If the company exceeds the allowance by more than two and one half per cent it may be excused by the Commission if the reasons therefore are considered by it to be sufficient. On the other hand, if the Commission does not excuse the company, any payments in excess of the two and one half per cent come out of the company's pocket.[1]

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[1] *Electric Railway Journal,* June 7, 1919, p. 1093.

[2] It is, of course, quite generally the case that the companies favor the incorporation of such "incentive clauses" in the contracts. In fact there has been developed a sort of psychological technique, the basic principle of which is the simple one of "more pay, more work." While this is a rather crass basis upon which to rest a scheme of special motivation, it has the merit that it is simple and, in the general run of cases, the most efficacious basis within reach. There is no need for a recondite psychology. Simplicity is paramount. See, for example, Draper, W. A., "Incentive in Service-at-Cost," *Aera,* October, 1920, pp. 257 ff.; Barker, H., "Incentive in Service-at-Cost," *Aera,* March, 1921, pp. 865 ff.

This device has real merit.[2] It is more tangible than any of the other devices referred to, it is adequately accommodated to varying economic conditions, since the allowance is set annually and excesses may be excused, and it is something which gets down a little further into human motives than the usual form of appeal to the pecuniary motive. The Montreal franchise, by adding a penalty for exceeding the allowance and a reward for keeping within it, provides amply for the play of both "pleasure" and "pain" stimuli, and is well adapted to accomplishing its purpose. It should be stated, however, as a matter of caution, that the success of the plan will depend entirely on how well the allowances can be set in advance and how strict the Commission is in excusing excesses. There are great difficulties involved in such a scheme, for the establishment of "standards of performance" for some one else to observe is an extremely illusive and difficult thing to do.[1] Certain practical considerations which should be borne in mind in this connection are set forth in the ensuing discussion of the fourth and last of these special devices for stimulating efficiency.

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[1] Art. 92, par. 1. A part of the excess may be allowed and a part disallowed, if the Commission sees fit.

[2] Something similar to it is found in a practice of the United States Shipping Board during the war. In making contracts for the construction of ships the Board allowed a "fee" of five per cent (in addition to costs). This "fee" might be increased to about six per cent or decreased to about four per cent in case the ships actually cost less or more than the amount originally estimated. (*Second Annual Report*, 1918, p. 130.)

Operating Allowances or Budgets

The last of the special devices to which reference was made has to do with operating allowances. These take one of two forms, depending on the source from which they originate. If the allowance is prescribed in the grant, although subject to revision by mutual agreement of the city and company or to arbitration, or if it is fixed by the city's administrative agency, it may properly be called an allowance; if the company originates the estimate and the city or its representative merely approves or disapproves it, it may more properly be called a budget estimate. In Cincinnati the company must submit forty-five days before the end of the year a budget of estimated gross receipts and operating expenses for the ensuing year. This must secure the approval of the Director of Street Railroads and is subject to arbitration in the event of disagreement. A supplementary budget may be submitted at any subsequent date, subject to the same provisions. Expenditures may not exceed the budget estimates except with the approval of the Director. Provisions similar to these are found in the defeated Minneapolis and Denver service-at-cost ordinances. These allowances and budget estimates usually apply to maintenance and renewals as well as to operating expenses. They are sometimes expressed in cents per car-mile, as in Cleveland, Youngstown, and Montreal, and sometimes as a statement of total expenditures although perhaps sufficiently classified to be convertible to a car-mile basis.

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[1] See British experience with the official revision system (1871–75) where it was necessary for public officials to interpret what "due care and management" on the part of company officials was, referred to in the discussion of the conditions which preceded the adoption of the sliding scale device. See also Whitten, *Regulation of Public Service Corporations in Great Britain*, pp. 113 ff.

The merit of such provisions is to be found in their calling attention to the need for keeping expenditures down, for planning, for seeing ahead. As such they are excellent devices in purpose and no doubt are feasible to some extent in practice. The service-at-cost plan cannot well function without such checks upon expenditures; they are an essential element of any scheme wherein a private organization acts as an agent for spending money for the public. The budget system, on the whole, seems to have the advantage over the allowance system, for it does not create that division of responsibility which is more likely to follow from the company's merely having to meet requirements which it has had no active part in establishing. There doubtless are difficulties under the allowance system, and of course the purpose of such measures is defeated if departures are made from the established amounts, either as a whole or through transferring unexpended amounts from one account to another. Provided they are properly made and strictly though intelligently adhered to, such allowances and budget estimates cannot but tighten up the whole organization.

Sober judgment necessitates the remark, however, that it will become increasingly difficult, as time goes on, to be certain that the operating allowances or the budget estimates reflect proper costs. For one thing, at the outset the city officials had a basis of comparison in the expenditures of the company immediately prior to the adoption of the plan. This basis becomes antiquated soon, however, with surprising speed. More fundamental is the fact that each year's allowances are based, more or less consciously, on the previous year's. There is produced thereby a cumulative effect which embraces minute, indiscernible additions of unnecessary expenditures. There is no "housecleaning" at periodical intervals, such as business houses are required to experience at times in order that they may get down to the rock bottom of necessary expenses.

There also is a further set of influences which contributes in a way to the effect just described. A company whose expenses are fixed for it by some outside agency, or which fixes its own expenditures subject to the approval of some outside agency, is similar in many ways to a government bureau. The company desires to spend, the bureau to expand. If the company is given no inducement for keeping its expenditures down it will be very much inclined, as is the government establishment, to spend up to the very last penny of its appropriation in a given year in order that its appropriation for the ensuing year may not be cut. The outside agency must therefore so set the operating allowance as to allow little leeway for unnecessary expenditures by the company and yet not set them so close as to require the allowance of excess expenditures each year, for such a practice would conduce to a state of mind on the part of the company which would be highly inimical to the success of the plan.

Results in Montreal

Because of the very great interest which attaches to the operation of the Montreal service-at-cost contract there is presented herewith a table, number XXIV, in which appear certain data taken from the first four annual reports of the Tramways Commission to the City of Montreal. It will be noted that deficits occurred in three of the four years. These diminished in amount in the later years and in any event they are attributable in large measure to certain delays in placing in effect increased rates of fare when they were seen to be necessary and to unexpected

TABLE XXIV. — BRIEF STATISTICAL SUMMARY OF RESULTS OF FOUR YEARS OF OPERATION UNDER SERVICE-AT-COST IN MONTREAL

	July 1, 1918 to June 30, 1919	July 1, 1919 to June 30, 1920	July 1, 1920 to June 30, 1921	July 1, 1921 to June 30, 1922
Length of tracks in operation (miles)	243.68	246.03	249.144	249.116
Revenue passengers	183,350,923	191,941,835	190,212,799	188,201,367
Actual fare collected per passenger (cents)	4.63	5.50	6.05	6.09
Average density of revenue passengers	7.918	8.386	8.724	8.734
Allowance for operating expenses and taxes (cents per car-mile):				
Motor cars	20.1	24.7	28.0	26.62
Trailers	13.7	17.4	19.751	19.43
At density of	8.2	8.4	8.5	8.5
Excess of actual operating expenses and taxes over allowance (dollars)	212,294.74	100,795.73	98,845.51	(a)63,441.22
Operating profit allowed ($\frac{1}{8}$ of 1 per cent of capital value) (dollars)	45,927.82	46,606.68	47,442.11	47,959.98
Allowance for maintenance and renewals (cents per car-mile):				
Motor cars	7.33	9.61	9.876	12.01
Trailers	4.80	8.13	8.163	10.64
Excess of allowance over actual expenditures (dollars)	42,032.97	307,482.27	..	210,964.30
Excess of actual expenditures over allowance (dollars)		..	381,521.88	..
Deficit for year (dollars)	(b)1,077,358.84	364,700.20	239,022.50	(c)187,947.51

(a) $1,364,111.44 for period from February 10, 1918, to June 30, 1919.
(b) Excess of allowance over actual operating expenses and taxes.
(c) Surplus.

rises in the cost of material and labor. The excess of operating expenses over the permitted amounts was not large in any year and decreased in the later years. The items making up these excesses were principally unforeseen increases in municipal taxes, in cost of snow removal, printing, etc., and the inability of the company to complete a hydroelectric plant which had been counted on to effect a large saving in power costs. The spread between projected and actual expenditures in Cincinnati seems not to have been unduly large, in view of the newness of the plan. In the second year, however, the City Director "was of the opinion that these amounts (i.e., amounts in supplementary budget) were excessive, and that by economy many of the items could be materially reduced." [1] Mention has been made in a previous chapter of the rather surprising extent to which, upon investigation, it is found that large economies can be effected in the operation of properties without deterioration of service or material additions to the capital investment. Thus, quoting from the same report, p. 11, "its benefits [the creation of a schedule department] became evident almost immediately, since by the proper application of the standards of service, increased service was provided during the rush hours and decreases made at other times . . . , thus enabling the company to save approximately $500.00 a day in platform time with an actual improvement in service."

Conclusions as to Service-at-Cost

Before leaving the present discussion of service-at-cost it will be well to attempt to formulate some general conclusions regarding it.

First of all, we must appreciate that service-at-cost is essentially a company move, not one which the public itself is instigating. Such was not the case in 1907 and 1909 when the Chicago and Cleveland ordinances were passed. Since that time, however, a profound change in utility affairs has taken place. Service-at-cost should be criticized for what it really is, a plan which the utilities themselves, and especially those of them which were in the poorest financial condition, have fostered to save themselves from a critical condition. If it saves the day for private operation and the American people feel that private operation of public utilities is more desirable than public ownership and operation of them, if it has, in other words, been a source of relief to the utilities and of a greater degree of education in public utility economics, much that is good can be said for it. In these respects service-at-cost meets our expectations and requirements.

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[1] *Report*, Department of Street Railroads of the City of Cincinnati, 1920, p. 21.

But as a form of management, a form in which there is a peculiar combination of public and private economy, a form in which so very much depends on the ability and energy and sincerity of the officials on both sides who have to see to its enforcement and proper development, it does bring in its wake a series of very real dangers. On grounds of efficiency alone there probably is less to say for it than against it. A gigantic economic force is here being turned loose on many communities. A new form of business management has been created. A new set of forces is here set at play. What the ultimate outcome will be is difficult and impossible to predict. That the American people should watch the dozen or so applications of the service-at-cost principle with a great deal of care and interest needs no argument. As fast as experience accumulates it should be made use of and any general extension of the idea should have to wait upon its proving its merit in these cases.

The lack of statistical or other external evidence of the merits of the plan has already been referred to. Statistical evidence will always be difficult to obtain and other evidence is limited principally to the views of individuals and will vary with their knowledge of the facts and their ability to see and state the facts fairly. But in five or ten years some reasonably conclusive inductions from experience should be possible.

An important objection, from the point of view of this treatise, to the service-at-cost principle is its failure to make a broad appeal to the motives which make for efficiency. Its appeal is almost solely to the pecuniary motive and even this appeal is directed rather narrowly. It is a mistake to rely so entirely on this motive; in many cases it does not function at all and at best it is difficult to work out a scientifically developed scheme within which it may function. Whether, so far as it could function, it is allowed to function, we are unable to say. Then again the appeal is solely to the stockholders' pecuniary interest. It should also and more properly be to the individuals directly and actively engaged in the management of the enterprises. If the appeal is made more to the motives of the active management it can doubtless be made more varied in character and bring in physical operating efficiencies. These points will be developed in the last chapter.

The only exception to the statement that the appeal of service-at-cost is solely to the pecuniary motive appears to be those features of the Montreal and other franchises in which operating allowances occur. These allowances, if set carefully and in the proper spirit, should do something to promote a desire on the part of the management to make a good showing, to live up to its part. Such a desire would bring into play professional zeal. Likewise, the adoption of service-at-cost in a community and the accompanying publicity should do much to stimulate utility managers to desire to stand well in the eyes of the public. But these motives are by-products, as it were, and whether they will function will depend on the management and the local situation.

Service-at-Cost still in Experimental Stage

Service-at-cost is still in its early experimental stages. What its ultimate developments are to be cannot be predicted. If the future opens up better days for the utilities it will not spread; so much can be said for certain. The public may not take kindly to the movement if it becomes general. It may prove ineffective. These are all possibilities between which we cannot at present choose.[1]

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[1] Since this chapter was originally written, the Federal Electric Railways Commission, appointed by President Wilson for the purpose of studying the electric railway situation, has made its report, the full text of which is given in *Aera*, September, 1920, pp. 154–84. The Commission "strongly recommends the principles of the service-at-cost contract, not

One very important aspect of service-at-cost should be touched upon, however, and that is its relation to state commission regulation. Service-at-cost is essentially a departure from the idea of state regulation. It is a movement which fits in admirably with the demand for home-rule, itself a movement which is always latent and which has been showing itself with renewed vigor recently. It is interesting to note that of the fifteen instances of service-at-cost analyzed above, three are in states which do not have an active public utility commission (Des Moines, Iowa, and the two Dallas, Texas, cases), two were established before a state public utilities commission was created (Cleveland and Ann Arbor), and four (Westerville, Cincinnati, Youngstown, and Toledo, Ohio) are in a state in which the powers of the commission are limited. The idea was adopted in Kansas City, Missouri, at about the time the state commission was created. The Massachusetts acts are peculiar. The general service-at-cost act provides for as complete control as ever in the hands of the state commission; the other two acts ignore the commission and establish boards of public trustees. The Montreal act largely undermines the authority of the Quebec Public Utilities Commission, although provision is made for certain appeals to it and for its coöperation with the Montreal Tramways Commission in the enforcement of the act.

The real clash between state and local utility regulation which is certain to follow upon a general adoption of service-at-cost agreements has not yet, therefore, taken place. But it has been sensed by some and openly discussed by others. A general service-at-cost act for the State of Indiana was proposed during 1919.[1] With one other exception service-at-cost has been quite generally ignored by the

as the only solution, but as one means of solving a very difficult problem" (p. 182).

[1] *Electrical Review*, March 8, 1919, p. 393.

state commissions. The Wisconsin Railroad Commission, moved by the statute recently enacted establishing a Board of Conciliation to handle labor disputes in any kind of business undertaking and which requires the commission to grant an increase of rates to a public utility if wage awards of the Board deprive the undertaking of a "fair return upon the capital employed therein," has recently expressed itself as willing to consider sympathetically any proposal for a state-wide automatic system of regulating rates.[1] It argues that it is in a good position to handle the necessary administrative work and feels that much of the delay in making the necessary adjustments to changing conditions will be obviated.[2] Mr. Halford Erickson, long an able Wisconsin commissioner, has also recently expressed himself very forcibly upon this subject and has, in fact, probably sensed the dangers to state commission regulation which service-at-cost harbors.[3]

Our reason for calling attention to this question of the conflict of authority between state and local regulating agencies which service-at-cost introduces is that we attach considerable importance to state commissions as a source of strength and as an agency for developing the efficiency aspect of utility regulation. We shall develop this point in the next chapter. All of these various considerations are, therefore, closely tied up with one another.

Possibly some importance should be attached to the following consideration. Service-at-cost requires the establishment of a well-paid local administrator or board. Such an agency cannot be afforded by small localities and the employment of inexperienced or less capable men would result in disaster to the service-at-cost principle. May it not be possible, then, that service-at-cost as a local affair will find its natural habitat in the large cities, leaving state regulation as we know it to-day or some form of state-wide service-at-cost to be applied to the smaller places? Such a division of territory would be conducive to many benefits and would perhaps bring about that balancing of the forces making for state and those making for local regulation which has always been lacking, thus removing a chief source of embarrassment and friction.

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[1] *Re* Milwaukee Electric Railway and Light Company, P.U.R. 1920A, 405–06.

[2] *Aera*, December, 1919, p. 598.

[3] *Aera*, August, 1919, pp. 65–75.

CHAPTER VI

METHODS AT PRESENT USED TO PROMOTE EFFICIENCY IN THE MANAGEMENT OF PUBLIC UTILITIES (*continued*)

The Promotion of Efficiency by Regulating Agencies

In the preceding chapter the discussion was limited to those methods of raising the standards of efficiency in public utility operation which have had their origin largely outside of the system of formal, continuous regulation by state commissions which is in general use in this country. These methods are, of course, as has been noted, not irreconcilable with the commission system of regulation. We now turn, however, to a discussion of certain matters relating to the problem of efficiency in the management of public utilities which come more particularly within the scope of the state regulation movement.

Certain Shortcomings of State Regulation

It may be remarked, at the outset, that the state commission movement itself is in something of a state of flux. It is, in fact, still on trial after a decade and a half or more of experimentation. Public ownership may eventually entirely displace it. State regulation, or any regulation, for that matter, is an attempt to control private action in the public interest. This is its characteristic object. If it fails in its effort to accomplish this purpose it will be for several reasons which need not be repeated in detail. But one of the potential causes of decay and disaster latent within the system of regulation as it has developed to date, is its very unwieldiness, its inability to make fine distinctions based on an intimate and sympathetic knowledge of local conditions. One of its principal claims to success, as envisaged in early accounts of its merits, namely, that large areas are brought under single control, is developing a counter claim that local problems can never be wholly satisfactorily solved by absentee regulators. This is a serious criticism. We shall see later what things can be or are being done to overcome this objection.[1]

Some lack of appreciation of local conditions on the part of the commissions has shown itself, for example, in their rather impersonal treatment of differences in the efforts put forth by individuals in control of the utilities under their jurisdiction. Of late, however, there has been improvement in this respect, so that the situation is to a considerable extent righting itself. Motives are everything and should be the factor principally governing the attitude of a commission toward a utility which is before it. Until quite recently, however, motives have been practically ignored to so great an extent that considerations of efficiency have largely been lost to view. At present certain tendencies are somewhat moderating this sort of criticism and are perhaps pointing to a better day ahead for regulation. Some of these tendencies will now be considered.

At any rate, while it is not necessary to assume that state commission regulation as it has developed up to the present day is likely to give way to some other form of control, it is well to bear this possibility in mind in writing so extensively on the commissions as sources from which forces producing efficiency may originate. Accordingly, in the discussion which follows an attempt has been made to adapt the suggestions so far as possible not only to present conditions, but as well to conditions as they may develop.

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[1] An unusually good picture of conditions in this respect may be obtained from the pamphlet, Reply of Public Utilities Commission [of Illinois] to Criticisms made against the Commission and General Statement relating to the Administration of the Public Utilities Commission Law, published by the Illinois Senate Committee on Public Utilities (Springfield, 1919, No. 54). The criticisms heaped upon the Commission by various local bodies, public and private, turn principally upon its alleged neglect of local interests. However able a commission may be and however mistaken these criticisms are, the fact remains that such an agency must not give the appearance of being blind to the very natural desire of local interests to be dealt with and considered at least, if their demands cannot in every case be appeased.

The Promotion of Efficiency a Duty of all Commissions

It is unnecessary to do more than restate the views expressed in Chapter III with respect to the place of the concept of efficiency in the regulatory process. The two propositions there were that regulation, if unchecked or unmitigated, conduces to inefficiency, and that therefore it is a positive duty of regulating agencies to overcome this tendency and to stimulate efficiency. The creation of conditions which will encourage rather than discourage efficiency is a constructive duty of all commissions. On economic grounds this proposition needs no argument; on legal grounds it follows irresistibly from the duties of commissions to protect the interests of the public and those of the utilities serving it. Both will be benefited by such a policy and a mutuality of interest will be substituted for an opposition of interests. In fact several of the statutes creating the commissions expressly allow them to give consideration to schemes of rate regulation and similar devices which will conduce to a more efficient management of the utilities. Thus the California Public Utilities Act, effective August 8, 1915, provides as follows in sections 20 and 21:

> Sec. 20. Nothing in this act shall be taken to prohibit any public utility from itself profiting, to the extent permitted by the commission, from any economies, efficiencies or improvements which it may make, and from distributing by way of dividends, or otherwise disposing of, the profits to which it may be so entitled, and the commission is authorized to make or permit such arrangement or arrangements with any public utility as it may deem wise for the purpose of encouraging economies, efficiencies or improvements and securing to the public utility making the same such portion, if any, of the profits thereof as the commission may determine.

Sec. 21. Nothing in this act shall be taken to prohibit any corporation or person engaged in the production, generation, transmission or furnishing of heat, light, water or power, or telegraph or telephone service, from establishing a sliding scale of charges; provided, that a schedule showing such scale of charges shall first have been filed with the commission and such schedule and each rate set out therein approved by it. Nothing in this act shall be taken to prohibit any such corporation or person from entering into an agreement for a fixed period for the automatic adjustment of charges for heat, light, water or power, or telegraph or telephone service, in relation to the dividends to be paid to stockholders of such corporation, or the profit to be realized by such person; provided, that a schedule showing the scale of charges under such arrangement shall first have been filed with the commission and such schedule and each rate set out therein approved by it. Nothing in this section shall prevent the commission from revoking its approval at any time and fixing other rates and charges for the product or commodity or service, as authorized by this act.

A similar provision is found in sections 9 and 20 of the Idaho act (an act to provide for the organization of the Public Utilities Commission, approved March 13, 1913) and in article III, section 1, of the Pennsylvania Public Service Company Law, approved July 26, 1913, as well as in the statutes of a number of other states.

Nevertheless these provisions are permissive only, and any action of the sort here advocated which the commissions may take is made to depend largely on the personal wishes of commissioners, which in turn are a reflection of their education, experience, and personal predilections. Any noteworthy improvement in this aspect of utility regulation would have to come, then, from the commissioners themselves as the body in most states which alone can be looked to for action of the kind here had in mind.

Difficulties in Commissions' Undertaking Such Work

Back of the statutory and personal situation was and is a political situation. In the early days state utility regulation was sought for by the advocates of the public's or the consumers' interests. But more recently it has become the covering to which the utilities are betaking themselves for protection from the worse evils which local regulation promises them. There are, then, two fairly distinct though overlapping periods in the history of utility regulation in the American states. The first era is one in which the utilities were in the ascendant, operating in a "seller's market" — a period of increasing returns or decreasing costs. The second is a period in which the public or the body of consumers is in the ascendant, representing a "buyer's" market and a period of decreasing returns or increasing costs. Political forces have therefore had to seek a new equilibrium. If, in the first period economic necessity did not require that close regard be paid to questions of efficiency, and political expediency made consideration of such matters entirely futile, in the latter period, when economic conditions do require that attention be paid to such considerations, political conditions cause disfavor to be visited upon policies conceived purely in economic terms.

It is impossible to put one's self in the place of the one hundred and fifty or more commissioners holding office in the United States and to speak for them. It may reasonably be assumed, however, that a number of them, it is impossible to say how many, are not unwilling to be interested, individually, in the kinds of problems that sustained and thoroughgoing attention to efficiency would require. But they are greatly handicapped in many jurisdictions by the strength of the public side and the relative weakness of the company side. If too great consideration is given to a company which is more than commonly efficient and if some effort is made to counteract the leveling and deadening effects of commission regulation, the public is very likely to rise up with the accusation that the commissions are unduly and improperly considerate of the interests of the utility and unmindful of those of the public. Hence it is that at the present juncture there are very considerable forces discouraging any such program of commission regulation as will be presently sketched, and in some cases threatening with dire disaster any commission which goes outside the beaten path in such matters.

As has already been observed, the political situation constitutes a sort of nebulous background against which all practical undertakings in utility regulation must be thrown to obtain a true notion of their possibilities. Regulation is a great play of forces; these forces in their interactions constitute a political situation. This situation, itself ever changing, must therefore be given primary consideration. All the actions of regulating bodies which will presently be analyzed bear the unmistakable stamp of the present political situation.[1] Since, then, recognition of the efficiency element as a factor in regulation involves extra effort as well as public censure and is in large measure a "labor of love," it is not surprising that the latent desires of many commissioners to give due weight to the efficiency factor are effectually suppressed even before they have been openly expressed.

Why Commissions are giving Increased Attention to the Promotion of Efficiency

That efficiency is being given some and increasing attention by the commissions at the present time is to be attributed largely, perhaps solely, to the economic conditions which at this time surround utility operation. No extended analysis of this proposition is needed at this point since it already has been dwelt upon at length. The whole of American business is feeling the effects of the same causes. In a word, American producers, no less than those of all other industrial nations, are entering upon an era of rapidly increasing costs. The differential advantages, the "producers' surplus," which we have always enjoyed, are largely passing away. A tightening up is in process. This is felt with maximum intensity in the utility field, for reasons already stated.

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[1] No desire is felt to be supercritical in this matter. Rather, the present situation is regarded as being perfectly natural and even inevitable. The absence of politics from the situation would eliminate the energizing or directing force, and would indicate either a deliberate "laying down" by one side or the other, or an irresistible march toward public ownership and operation.

In the face of such a change in the general economic outlook there has come a shifting of the emphasis in American industry and an increase in the amount of attention given to sources of economy which previously had been overlooked. In the utility field it is perhaps not too much to say that the chief gain which may be expected to come from this change is in the removal, not altogether but in large measure, of utility management from the speculative to the operative field. This is a transformation so fundamental and hopeful that it is an immeasurable gain. Such would not have been the case at an earlier time, for then pioneering was essential. Now that utilities have reached a relatively mature state the emphasis can very properly and advantageously be shifted. By giving more careful regard to technical economies we shall at last get somewhat more in line with developments which took place in England many decades ago. Speculation of the unmitigated sort must give way to a controlled and subdued speculation; utility investments must take on a greater stability of character. And while this process will require a greater certainty of utility earnings, it should not be inferred that it is inconsistent with the seeking of special rewards for special efforts. In fact, and this is a fundamentally important statement, the very conversion of utility enterprise from a speculative to an operating basis makes it all the more necessary to provide some special device for keeping alive the human interest in the individual undertaking, if the stagnation or the other evils commonly associated with public operation are to be avoided. Just as the consumers' coöperative movement fails to take root in a country the economic conditions of which do not compel close attention to small economies, so in the utility field small increments in income could have been of little avail so long as larger profits were possible through bold speculative enterprise. In this and the last chapter we are, therefore, dealing with what may be considered to be a new era in the history of public utility development in the United States, an era in which relative fixity and certainty of income has displaced variability and uncertainty, in which small increments of income will serve, along with the methods of appealing to other motives which will be treated in the last chapter, to give us that amount of elasticity, energy, and individualism in public utility management which is necessary to keep it on a high and socially beneficial plane.

Economic and political conditions and the personal inclinations of the individual commissioners constitute, then, the outer obstacles or barriers in the way of bringing considerations of efficiency into more prominence in the regulatory process. Education of the public, of the commissioners, of the utilities is the only direct stimulant for lack of appreciation of or interest in, and the only antidote for positive opposition to, such considerations on the part of any of these groups. The analysis from this point on will assume that such obstacles have been or can be overcome in large measure.

Ways in which Commissions can Promote Efficiency

What, then, are the possible ways in which commissions, assuming a conscious and sustained desire on their part to promote efficiency in the management of the utilities over which they have jurisdiction, can bring about conditions that will not only not discourage but actively promote the seeking for efficiency on the part of utility managements? These are perhaps four in number: (1) Through the giving of engineering, accounting, and other similar assistance to utilities with a view to the improvement of their operation; (2) through the collection, analysis, and, in given cases, the publication of cost and efficiency data and the making of comparisons and efficiency studies; (3) by "rating" utilities, a rather special device which arises out of (2); and (4) through the kind of treatment, liberal or otherwise, accorded a utility when it comes before the commission for the adjudication of differences or the determination of matters in the course of the routine of regulation. Of this last group of methods by far the most important, and also the most obvious, is control of the rate of return which a utility is allowed to earn. To this and its necessary correlate, the valuation or other basis upon which the return allowed is calculated, special attention will be given. Other aspects of this group of methods are presented in the regulation of service, of competition and of security issues.

The treatment of these several subjects will be largely in the order in which they are named. While this order of treatment leaves till the last the most important of the methods, it is thought best to observe it since it permits a leading up from the simple to the more complex and controversial. It also supplies us with certain information and material needed in the analysis of the fourth group of methods.

Engineering, Accounting, and other Technical Assistance

The most obvious and direct manner in which state commissions find it possible to promote the efficiency of utilities under their jurisdiction is through giving advice and active assistance along engineering, accounting, and other technical lines to those companies which they find are in need of such assistance. To a certain extent work of this character has had its origin in a definite, thought-out policy of the commissions, or of some of them, but more largely it has developed as local situations have created exigencies which required, both from the public and the company points of view, that such assistance be given. This being the explanation of its origin, it is readily seen why such work has developed in volume in recent years. Economic conditions have been such that many companies, unable to help themselves, have been not unwilling to receive such counsel as the commissions have found it within their means to offer.

This work is, however, of long growth and gradual development. In the course of their everyday work commissions have made inspections of the service rendered by various companies in the state to see if it measures up to the state requirements; they have also made engineering studies, valuations and audits, have installed accounting systems, and in other ways have brought to bear upon individual local situations the technical knowledge and experience which they have accumulated. But work of this character has been called out principally in the course of investigations as to rates which companies should be permitted to charge. A company petitioning for a rate increase or against a rate reduction may well be asked to put its house in order; the manner of so doing is a matter about which the commissions frequently have something to say. It is surprising what large savings often are found possible by application of scientific methods and by exploitation of the newest developments in the technique of the industry.

The Wisconsin Railroad Commission was probably the first of the commissions to develop work of this kind on a large scale. This commission was peculiarly fortunate in its original membership and in the environment in which it had to work. The original commissioners were men of unusual ability and earnestness, and were able, because of past experience and education, to approach their problems in a professional spirit and with a scientific zeal that all too commonly are lacking among the commissions of the various states. The general tendency in Wisconsin in the early days of the public utilities work of the Railroad

Commission was to receive and encourage expert assistance. If there has been of late something of a reaction from this attitude in Wisconsin, similar work is being done in other states, perhaps less obtrusively, and with equally effective results. It has come about that the commissions of the more active type are looked to for much assistance, and they have thereby become an important factor in elevating the general plane of utility operation in certain states.

Illustrations of this Kind of Work

There are endless cases in which such assistance has been given by the commission. It is not true, of course, that the companies have always thought it desirable to act upon the counsel given, and the commissions can require compliance with their recommendations only by the indirect means of bringing pressure to bear upon the companies through refusing rate increases or by making rate reductions. A few recent cases will serve to make this discussion somewhat more concrete. The Indiana Public Service Commission, in Indiana Fuel & Light Co.[1] expressed the belief "that there is something seriously wrong with petitioner's management or operation" and set about to find out what the trouble was. Its engineer, who visited the company's plant, reported certain respects in which there was inefficiency and recommended, among other things, that the general process of gas manufacture be changed. Again, the California Railroad Commission, in *Re* Los Angeles Railway Corporation,[2] stated that "an increase in fares . . . might possibly be avoided if the engineers' (i.e., the Commission's engineers') recommendations were carried out and the management and operation of the system put on an efficient and economical basis," the engineers' report demonstrating "that very large savings in operating expenses alone . . . " amounting

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[1] P.U.R., 1921E, 608.

[2] P.U.R., 1922A, 66.

"to between $800,000 and $1,500,000 per annum" were possible. The Commission further criticizes the organization of the company, saying that a modern system with centralized authority and definitely placed responsibility should be developed.

A last illustration may again be taken from the work of the Indiana Commission. This commission's work in connection with the Indianapolis street railway situation has put that situation on a sound basis, albeit it has entailed some criticism of the Commission itself.

> Here is a company which, under rigid orders of this Commission, was reorganized and its securities reduced by $6,100,000. The water has been squeezed out. The fixed charges also have been reduced. The company, from the standpoint of its financial organization and fixed charges, is on a safe and sound basis. For more than two years the company has been very closely regulated by this Commission. Methods of operation have been changed at the direction of this Commission. Economies and efficiencies have been effected and adopted. Under orders of the Commission great improvement in service has been made. New equipment has been added. Needed extensions of lines have been made at the request of the Commission. For more than two years this company has made every effort to conform to its obligations as an agency of public service. Through economical operation and good management the company stands alone in the entire country as compared with cities of similar and considerably larger size, in maintaining a basic five-cent fare, and the citizens of Indianapolis, by the economies and management of the company, have been saved millions of dollars in street car fares as compared to citizens of the larger number of other similar sized cities in the United States.[1]

Commissions must participate in Management

It is to be understood, of course, that in taking upon themselves this work the commissions have not consciously desired to usurp the functions of management. To be sure it is, as has been noted, extremely difficult to draw a sharp line of demarcation between the functions of private management and those of public management. This question of definition and delimitation of function is constantly presenting itself in actual cases, and in some states, as Illinois, the commissions have been rebuked by the courts, who have attempted to put them back in what is considered to be their proper bailiwick. The courts, however, have not grappled with the fundamentals of the situation, and any stand they may take, such as that taken by the supreme court of Illinois,[1] can only temporize with the situation, not solve it. The fact should be faced that, for better or worse, the commissions do share in the management of utilities, and must do so if they are to function as it is expected they will function.

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[1] *Re* Indianapolis Street Railway Company, P.U.R., 1921B, 154.

It is to be borne in mind also that assistance of this kind would in most respects be gratuitous so far as certain of the companies are concerned. This assistance has been given particularly to the smaller undertakings, especially the small non-syndicate companies, and to municipally owned plants. There is, in other words, a very natural limit placed upon work of this kind by the extent of the facilities at the disposal of the commissions, and by the relative capacity of their employees and those of the better managed companies, particularly of the syndicate companies. It is, however, to be noted that it is not always the small companies which the commissions find to be inefficient.

Nearly all the commissions have departmentalized their work. In this way greater specialization is possible, and an assignment of work according to the personal tastes and capacities of the several commissioners.[2] Since many of the laws creating the commissions require that at least one of the commissioners be an engineer or "a practical, experienced business man," much depends on the interest and opportunities of the "engineer commissioner."

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[1] State Public Utilities Commission *ex rel.* Springfield *v.* Springfield Gas and Electric Co., P.U.R., 1920C, 601.

[2] For example, the Wisconsin Railroad Commission has four departments: engineering, which, aside from purely engineering matters, makes appraisals and valuations; statistical, which has charge of the accounting and statistical work; service, which carries on the detailed inspection work and sees to the companies' and municipalities' compliance with the

More Work of this Kind should be done

While, then, it cannot be said that a thoroughgoing and active program of giving engineering, accounting, and other assistance to utilities has been developed generally among the states, there are the examples of the beginnings and development of such work in many states. No thoroughgoing, state-wide investigation of the utilities of a state has ever been made, so far as is known, although something approaching this has been carried out in the form of investigations incident to the establishment of state standards for gas, electric, telephone, and other service. Much more can and should be done by the commissions. If proper restraint is exercised, so that the companies will not learn to lean too heavily on the commission for matters which they may be better able to handle themselves, much can be done, within the limits stated, by the commissions to raise the standards of and to lend progress to public utility operation. Because of the importance of this matter further attention is paid to it in the concluding chapter.[1]

Collection and Analysis of Cost and Efficiency Data

Closely related to the first of the four methods by which the state commissions can contribute to the cause of

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state service standards; and tariff, which has to do with rates, particularly steam railroad rates.

[1] Mr. E. O. Edgerton, until recently president of the California Railroad Commission, has gone so far as to suggest that the state commissions be given the power to operate inefficient or bankrupt utilities. (*Journal of Electricity*, March 15, 1921, p. 279.) This suggestion is considerably in advance of any made in this chapter, but in specific instances such operation would by no means be unwarranted.

efficiency in the management of public utilities is the second, the collection, analysis and, in given cases, the publication of cost and efficiency data, and the making of comparisons and efficiency studies. The two methods are related in so far as they contribute information and suggestions which are mutually useful. Thus, while the first method involves the study and the rendering of assistance to the individual plant, the latter carries the information and experience thereby gained to the broader field and adds to it by special engineering, accounting, and statistical studies. It also singles out those plants which stand in special need of assistance. In this chapter the treatment of this subject is limited to a discussion of what has actually been accomplished by the commissions along this line; in the final chapter appears a constructive program for work of this sort.

Importance of Adequate Accounting

No argument is made or deemed necessary to convince the more enlightened of the private interests that good accounting, especially good cost accounting, is essential to successful management.[1] Accounting for private purposes and accounting for purposes of regulation, while in some respects different, can and should be made to work together; in fact, the present discussion is largely an attempt to make accounting for purposes of regulation answer more nearly the same needs as does accounting for purposes of private administration and control. It also is to be borne in mind that there are wide differences in the outlook of the managers of large urban or syndicate utilities and that of the managers of small, isolated utilities. The latter need to have their accounting elevated to the plane of that of the commissions, while the larger companies do not, as a rule, require such assistance.[1] It is not necessary, therefore, to repeat at this point the earlier reference to the need for every utility's having an adequate accounting system. This need, it may be assumed, should be communicated to the backward utility through the medium of commission advice and assistance.

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[1] The assumption here may be a little too general in view of the estimate of the Federal Trade Commission that ninety per cent of American corporations are without adequate cost data. (Riegel, J. W., "Standardized Reports of Industrial Experience," *Annals of American Academy of Political and Social Science*, vol. 82, p. 254, March, 1919.) The Missouri Public Service Commission has also found that "A considerable part of the utilities operating in this State have no record of their plant value, do not keep separate accounts for the different classes of joint utilities they operate; some conduct a combined public utility and private business; the revenues received, the expenses disbursed and the original cost of the plants producing different services have not been recorded separately for each enterprise; consequently, such companies do not know which enterprise produces profit and which is operated at a loss . . . After summarizing the assets and liabilities and analyzing the revenues and expenses from the data submitted, it was frequently found that the plants were being operated at a loss, due to improper management, excessive coal consumption, etc., and for the reason that no provision was made for plant replacements; the net revenues in some of these plants being hardly

"*Publicity*"

It is very easy to lose the proper historical perspective in a study of this sort and to overemphasize a matter which appears important at the present time but which actually is secondary to other considerations which historically are of prior importance. Thus in the present instance the object of the states in giving their commissions the authority to require the utilities to keep certain prescribed accounts, and in some states to keep no other accounts, and to render reports based on those accounts, was

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sufficient to meet interest requirements." (*Third Annual Report*, Public Service Commission of Missouri, 1915, p. 36.)

[1] "Small utilities are generally better off from being obliged to make extended returns to regulating commissions. Some of them learn for the first time what parts of their works are profitable, what are not, where and how economies are or may be practicable, how their costs compare with those of other companies, and where savings and improvements ought to be established. Considerable latitude in the character of returns required, however, should be accorded in cases where the keeping of elaborate accounts would be a hardship." (*Electrical World*, July 26, 1919, p. 171.)

not primarily to promote efficiency in company operation but to afford "publicity" and to give the commissions the fact basis upon which they could base their decisions and compel compliance with the law. As has already been remarked several times, efficiency has become an issue in utility operation only in comparatively recent years. While, therefore, due weight should be given to the other and earlier reasons for allowing the commissions to prescribe accounts, from the point of view of the present discussion these considerations are secondary to the one upon which emphasis is here placed, viz., the promotion and maintenance of efficiency in the management of public utility enterprises.

Meaning and Uses to be made of Cost and Efficiency Data

By cost and efficiency data are meant data which show the cost of production, in its largest sense, usually computed on a unit basis. Thus these costs are usually stated in terms of the kilowatt-hour generated in the case of electric utilities, in terms of thousand feet of gas produced in the case of gas utilities, per passenger or better per revenue car-mile in the case of electric railways, per gallon of water pumped in the case of non-gravity water supply plants, and per message or per station in the case of telephone service. These units are comparable with the passenger-mile and the ton-mile of steam transportation, with which economists are generally more familiar.[1] Such data are based in turn on two other sets of data — the one relating to expenditures and revenues and capital accounts, and the other to production, consumption, capacity of plant, number of customers, consumption per customer, etc. The reader will recall some of the statistical matter found in Chapter II. The so-called "efficiency data" relate more directly to the conditions of physical operation and do not involve costs in the money sense. Thus, in the case of several kinds of utility, the efficiency of operation is largely a question of the manner in which coal and labor are utilized. Therefore, pounds of coal consumed per kilowatt-hour generated or per thousand feet of gas made is a very significant figure, and furnishes a sort of key to the entire operation of the plant.[1]

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[1] Such a book as Woodlock's *The Anatomy of a Railroad Report and Ton-Mile Cost* is entirely lacking in the public utility field. There is great need of such a treatise as Boag's *Manual of Railway Statistics* (London, 1912), which would provide a good critical analysis of public utility statistics.

Such unit costs and efficiency data as have just been mentioned are useful when developed for a single plant, especially when known for a period of years. They enable the company itself to find out how it is doing from year to year and allow the commission to judge whether a given company is measuring up to its possibilities. But such advantages as these data have when computed for a single company or collected and studied apart from similar data for other companies, are greatly amplified through comparisons between companies. In this way commission accounting control and the publication of statistical results by the commission enters in, for in this way not only is a greater degree of uniformity within the state produced and one company enabled to compare its results with those for other companies similarly situated, but the value of any single company's statistics is more than proportionately increased through the mere increase in the number of companies for which statistics are given. Such being the case, it is but natural that comparisons are made, first, by the commissions, and second, by the utilities themselves, or at least by certain of them. The commissions can single out the inefficient utilities and give them special assistance and can determine certain general tendencies, such as increase or decrease of costs and of operating ratios, variations in the character of securities and the return on capitalization, and many other similar matters. It can, in other words, draw conclusions which apply to a single utility, or to a kind of utility enterprise, or which are applicable to all the utilities of a state. It is thus able to keep its finger on the pulse of the utilities of the state and adapt its actions and policies accordingly.

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[1] The public utility laws of two or three states require the commission to collect and publish certain specified unit costs. (See Wisconsin act, sec. 1778a, and Indiana act, sec. 29.) Unfortunately, these are not always the most essential ones, and unless the commission on its own initiative computes other unit costs, its published data are likely to be of little value. The Wisconsin Act specifically provides for the prescription by the Commission of such standard units as are mentioned above. (Sec. 1797M-22.)

Direct Appeal to All of the Motives of Management

The utilities, likewise, can watch their own results from year to year, can compare themselves with their neighbors, and the directorate can judge somewhat of the success of the management it has placed in charge.[1] The appeal here

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[1] These benefits are more broadly expressed in the following quotation from the *Third Annual Report* of the Public Service Commission of Missouri, 1915, pp. 37–38:

"*Benefits of Uniform Accounting System;* When the prescribed accounting system has been thoroughly understood and followed in detail and the annual reports of the utilities have been incorporated in comparative schedules and tables, it will be of immeasurable benefit in ascertaining average life, average cost, and average operating efficiency data. It will aid in settling many controversies between the utilities and the communities they serve, as the annual report of each utility will show whether the rate of return is sufficient, exorbitant, or inadequate. It will aid in procuring new capital, as the prospective investor will know that the capital investment of the company, as shown by the records, will contain only proper charges to that account and that the records of the past operations will reflect true conditions. The holders of bonds will know that the integrity of their investment is being preserved through the medium of a proper reserve for depreciation. The stockholders can readily ascertain by a study of the report the present condition of their property and they will know that the dividends received were not declared before making a reserve sufficient to care for future contingencies and replacements. Those in control of the utilities' operation will be better able to ascertain wherein the service and management could be improved, and finally the tables of plant investment, capitalization and operating costs of the various utilities of the State set up in comparative form will be of immeasurable value is to all of the motives which govern in the management of public utilities. The pecuniary motive is appealed to both on its positive and its negative side for the controlling ownership group, the entrepreneurial manager, and the non-entrepreneurial manager. Thus gratification is felt by the first of these classes if the showing is good, if the return is shown to be as good as or better than the average, and if the investment in the property is shown to be well maintained. Likewise, dissatisfaction is certain to arise if the showing is poor, if the return is shown to be below the average or growing worse year after year, and if the property is seen to be running down through neglected maintenance and inadequate provision for depreciation. Since this phase of the pecuniary motive is the more compelling of the two, one may expect greater use of these statistics and operating studies to be made by utilities which are failing to be prosperous than by others.

Likewise, the individual entrepreneurial manager, aside from sharing the feelings of the group above, has the spirit of emulation stirred in him by such statistical array of the results of his efforts. But to none of the factors in management do such statistical portrayals appeal so directly and unerringly as to the non-entrepreneurial, the "hired"

to those utilities who seek beyond their own immediate environments for knowledge of their particular business."

The following statement by B. H. Meyer, then of the Wisconsin Railroad Commission and now of the Interstate Commerce Commission, while not recent, gives a good historical statement of the benefits which Wisconsin utilities receive from the Commission's accounting regulation and assistance:

"The utilities law is working a revolution in business management. While some managements are doubtless models from a business point of view, they are not the general rule. Many of the utilities companies have not been operated on a business basis; in fact, it is probable that a good many of the managements did not have the remotest idea as to the exact standing, from a business point of view, of the plant they were operating. Uniform accounting and rules governing the service and the regulation of rates, compel the adoption of business and scientific methods. This is nothing short of a revolution in management." (Taken from a paper by B. H. Meyer in C. L. King's *Regulation of Municipal Utilities.*)

manager of a utility. While he is not responsible for all variations in cost and variations in efficiencies, he is properly held responsible for a great many of them, as was shown by the division of the twenty-six indices which make up Table XII into the three heads — general financial, managerial-engineering, and managerial-commercial. And while it is true that the manager makes his periodic, often very frequent, reports to the directors on the condition of the particular plant, no means are thereby provided for comparisons between his plant and other plants near by or similarly situated. Where ample statistics are published by the state, he can compare, evaluate and reckon, and be compared, evaluated and encouraged, or released largely, although of course not entirely, on just such showings as these. They are a statistical statement of the results, costs per unit of product or sales development, which he has obtained from the equipment he was given to work with, consisting of a certain capital, partly in the form of a plant and partly in the form of materials and working capital, and of certain labor or labor-hours. All of his motives are actively aroused. The pecuniary motive is appealed to through the desire to get ahead, which is contingent upon making a good showing, or the desire merely to hold his own against a never-ending competition. More important than this are the promptings of emulation, professional zeal, and social self-esteem. As will be seen a little later, in one state these results are actually embodied in "ratings" of individual plants. But whether this is done or not, there is set up a method by which the manager can judge of his own work and be judged. That which is so entirely lacking in public employment, a basis or unit of performance upon which personal efficiency ratings can be based, is here found. To be sure such statistics must be treated with great care in order not to bring in irrelevant considerations. But the conditions are certainly favorable for such comparisons as will awaken a feeling of emulation, a professional interest, and perhaps to a less degree, a feeling of social self-esteem in case of a good showing.[1]

Inadequacy of Present Accounting and Statistical Practices

The foregoing discussion of the possible uses to which cost and efficiency data may be put has perhaps aroused the expectation that such data are available in abundance at the present time. Such is far from the case. First of all, there are wide differences in the extent to which uniform accounting systems have been adopted by the state commissions and also in the details of the accounting systems which have been adopted. Approximately one half of the state commissions had, to about the year 1920, adopted uniform accounting rules for electric, gas, and telephone companies; about two thirds for electric railways (based almost entirely on the uniform classification of accounts for electric railways prescribed by the Interstate Commerce Commission); and about one third for water companies. Where accounting rules have been prescribed there is a great and needless complexity as well as a lack of uniformity and completeness in accounting terminology and classification from state to state. A very serious defect of state accounting requirements as they have developed to date is their failure to correlate revenues by sources with expenses by sources. A first principle of good commercial cost accounting is the determination of costs which can be compared with their equivalent returns, where there are two or more distinct departments of production. In utility operation, where there are always several kinds of service rendered — electricity for light, for power, on-peak and off-peak, municipal lighting, street lighting, etc., no attempt is made, except in a few states (Illinois, New York, etc.) to relate the revenues and expenditures according to such a basis as this. Certain states, as Wisconsin and New York, have set the pace in the matter of formulating accounting requirements and have been followed as models by many others. Aside from the uniformity thus introduced, there is little that can go by that name. Oftentimes the variation is slight but nevertheless sufficient to debar comparison of the statistics of one state with those of another.[1]

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[1] The benefits to be derived by the persons, however subordinate, who help to prepare statistical reports, are by no means negligible.

Cost and efficiency statistics are necessarily derived from returns rendered at certain intervals to the commissions by the utilities. It has just been indicated that in many states there are no accounting requirements of any sort for public utilities, and that in many other states such accounting requirements as there are, are inadequate. Thus, there is either a lack of sufficient detail or a lack of completeness that makes significant cost analysis impossible or at least very difficult. Thus many states which require quite good financial reports often fail to insert in their report forms questions covering physical operation and development, and so leave out the necessary divisor for any cost computations. It is to be borne in mind also that eternal vigilance on the part of the commissions is necessary to see not only that its accounting requirements are complied with, but also that a literal compliance with the requirements does not hide iniquitous overcharges or undercredits. It would be dangerous and impractical to assume that accounting rules alone and other policing measures will be able to promote a high degree of efficiency. That the individual entry may be proper *in amount* as well as in classification requires attention to the motives of those whose business practices merely are reflected or recorded in accounting and statistics. Let us not forget the motives of management, for these are the fundamentals.

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[1] There has been for some time a concerted effort on the part of the National Electric Light Association and the American Gas Association to secure the adoption by all states of a uniform system of accounts for electric light and power and gas companies. In 1920, after many years of deliberation, the National Association of Railway and Utilities Commissioners, through its appropriate committee, had presented to it, for such use as the individual commissions see fit to make of them, uniform classifications of accounts for electric and gas companies. These classifications are set forth in full in Proceedings, 1920. If the state commissions adopt these classifications, without material departure from them in detail, a great impetus will be given to the scientific study of utility problems. The United States Railroad Administration developed certain standard operating statistics for efficiency purposes. Director-General Hines, in an address before the National Association of Railroad and Utilities Commissioners, Proceedings, 1919, 293, speaking of the great value of these statistics, said in part:

"The result is that these statistics, which had never before been developed for the railroads of the country as a whole, have been so developed that many of the railroads now get information about their own operation which they did not have before, and all the railroads now have an opportunity to compare their operations with those of other railroads, which was before impossible. The existence of these operating statistics has, I believe, greatly stimulated the study of efficient practices on the part of the railroad officers throughout the country."

Use of Statistical Material — by Commissions and Public

It is impossible for an outsider to gain information as to the extent to which the state commissions have made use of these statistical reports in the course of the process of regulation. As has been pointed out, the primary purposes of accounting and report requirements were to secure publicity and to enable the commissions to perform their work with as full knowledge of the affairs of the utilities as they could obtain. How far the former of these purposes has been realized will be shown presently. As to the latter, it seems possible only to make the generalization that the amount of such use of these statistics depends on the inclinations and resources, financial and personal, which the individual commissions have at their command. The Wisconsin Commission has made very extensive analyses for its own purposes; so have the two New York commissions; the Missouri Public Service Commission remonstrates against a niggardly state appropriation which makes such analyses almost impossible. There is undoubtedly an abundance of unused material stored away in the files of the commissions. It could not be used beyond the confines of the state, however, and would require a great deal of patient endeavor to put it in shape for investigational use, as Lincoln has discovered in his work with the Massachusetts reports.[1] The commissions must energize the statistics they collect by applying them in the solution of their problems.

Evidence as to the extent to which the other purpose of requiring accounting and statistical returns is realized is somewhat more obtainable. The principal sources of information here are the published reports of the commissions themselves. A careful analysis has been made of the reports of all the state commissions, with one or two minor exceptions, and usually for a considerable period of years. These reports are the public's chief source of information as to the utility affairs of the state. Some of these offend against every rule of statistical science. None of them are published soon enough after the end of the year or two years to which they relate to have any immediate interest and value; few are complete, for the reasons above stated; many of them are based on unverified and unchecked returns made by the companies, sometimes by ignorant and careless individuals, and little assurance is found that the individual items making up the reported totals were properly entered in the first place. The result is a hopeless mass of statistical matter, exhaustive in one case and barren to the highest degree in the next, poorly tabulated in many instances and oftentimes exasperatingly lacking a few items which are needed to complete the analysis. Out of such material as this, this study has had to be wrought to a large degree. The obstacles which have thus been put in the way have caused the abandonment of one specific line of investigation after another. Even in those states which have given some attention to such matters, there are serious omissions and discrepancies, and comparison between them is utterly impossible.

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[1] Lincoln, E. E., *Results of Municipal Electric Lighting in Massachusetts*, especially chap. III.

To present this situation in a clearer manner the following tabulation has been prepared.[1] From this can be gained a good idea of the extent to which the states have lived up to their possibilities in the matter of publishing adequate statistical reports. There undoubtedly is some improvement in these matters, but the lack of interest on the part of the commissions, their ignorance of the subject of statistics and failure to appreciate the importance of good statistics, and perhaps more to the point, their willful neglect of matters which would improve their statistical material, present an outlook which is far from favorable.

Use of Statistical Material — by Companies

So much, then, for the commissions themselves. Question may next be raised as to how far the utilities make use of these reports of the commissions and as to what their practical effect on efficiency of operation is. The answer to this question is an exceedingly difficult one to give. The Missouri Public Service Commission refers to the "requests of many utilities for information contained in reports of other utilities of like service and similar capacity (which) show a gradual awakening to the storehouse of useful information now available from our files." This is probably the situation in most states. While at first the utilities were generally unwilling to encourage such statistical and efficiency studies, their work in behalf of greater uniformity in matters of statistics and accounting, while based in part on a desire for economy of money and effort, is also an indication of increasing friendliness toward such efforts. Nevertheless there is much indifference on the part of a very large part of the utilities of the country to such work of the commissions. It is probable that as little attention is given to the commission reports by the majority of

[1] Table XXV.

TABLE XXV. COMPARISON OF STATISTICAL WORK OF THE SEVERAL STATES

(1)

States in which unit costs are computed.

Illinois: A few only. See also (2).
Indiana: A few only.
Iowa: A few for electric railways only are computed.
Massachusetts.
New Jersey. See also (2).
New York, First District. See also (2).
New York. Second District.
Ohio: A few for electric railways only are computed. See also (2) and (3).
Oregon: A few for electric railways only are computed. See also (2) and (3).
Rhode Island: do.
Vermont: do.
West Virginia: do.
Wisconsin.

(2)

States in which unit costs are not computed, but in which unit costs could be computed.

California: For electric railways only.
Connecticut: To a limited extent.
District of Columbia.
Illinois: To some extent.
Kansas: do.
Maine: For electric railways only.
Maryland: To some extent.
Michigan: For electric railways only. See also (4).
Minnesota: For electric railways only, to limited extent.
Nevada: To a limited extent for gas and electric companies.
New Hampshire.
New Jersey: Some unit costs other than those now computed could be developed. See also (1).
New York, First District: Unit costs other than those now given could be computed. See also (1).
North Carolina: A few for electric railways only.
Ohio: For electric railways only. See also (1).
Oregon: Some unit costs for electric railways could be computed and to a limited extent for electric and gas companies. See also (1) and (3).
Rhode Island: A few for electric railways in addition to those now given could be computed. See also (1).
Vermont: do. See also (1) and (3).
Virginia: A few unit costs for electric railways only could be computed. See also (3).
West Virginia: A few unit costs for electric railways and natural gas companies could be computed. See also (1) and (3).

(3)

States in which unit costs cannot be computed.

Alabama.
Arizona.
California. See also (2).
Colorado.
Florida.
Georgia.
Idaho.
Iowa. See also (2).
Kentucky.
Louisiana.
Maine. See also (2).
Michigan. See also (4).
Mississippi.
Missouri. See also (1).
Montana.
Nebraska.
New Mexico.
North Carolina. See also (2).
North Dakota. See also (4).
Ohio. See also (1) and (2).
Oklahoma.
Oregon. See also (1) and (2).
Pennsylvania (additional statistical work being done).
Rhode Island. See also (1) and (2).
South Carolina.
South Dakota.
Tennessee. See also (4).
Utah. See also (4).
Vermont. See also (1) and (2).
Virginia. See also (2).
West Virginia. See also (1) and (2).
Wyoming.

(4)

States in which commissions are new or recently reorganized.

Arkansas (1919).
Michigan (1919).
North Dakota (191–).
Tennessee (1919).
Utah (1917).

companies as is possible. The companies have their own reports and at any rate are not given to expect much from such a source, largely because of the results which they have already seen to emanate from it. Possibly in those states which have fairly good reports some use is made of them by wide-awake operators and directors, but such are in the minority. If these matters were handled as they should be, state commission reports could be highly beneficial and stimulating sources of information for the utilities, the public, and for students of utility problems. The need, therefore, both on the part of the commissions and the utilities is for education along these lines and the furnishing of some pabulum which will show the immense possibilities of such work and whet their appetites for more.

Rating of Utilities

When a commission has had some experience with the utilities under its jurisdiction and learns to know their individual likenesses and differences and especially when it has developed statistical material relating to their activities, it would seem a natural next step to attempt to classify them in some way. The necessity for generalization often presents itself in the course of the process of regulation. Thus a general although indefinite notion of what an "efficient plant" is, or a well-developed business, or a satisfactory relation between the utility and the public, is gradually arrived at from practical contact with utilities. Such beginnings of a classification of utilities are probably made in nearly all states, but it is too unsubstantial and changeable to be committed to written expression and to last beyond the tenure of individual commissioners.

From our present point of view such classifications of utilities are of fundamental importance. Without them it is impossible to reduce to order, and to form that permits of ready handling, the great variety of showings made by individual companies. Hence on several occasions in this paper rough groupings of utilities have been made. So far as can be determined, however, nothing of this kind has ever been done by the commissions, at least on an adequate scale and in a form for general public use. The only approximation to such a classification at the present time is a system which has been worked out in the state of Wisconsin.

"*Rating*" *Practice of Wisconsin Railroad Commission*

The Wisconsin Railroad Commission has developed a system of "rating" utilities out of its inspection work. Its engineers, as the result of their inspections of individual plants to determine the extent to which they comply with the service standards promulgated by the state, conceived the idea of establishing a series of grades that would, when summed up, give the commission an idea of the performances in this respect of the various plants in the state. The series of points upon which gas and electric companies are graded is given below. A similar series for telephone utilities, covering their degree of compliance with the state's telephone service standards, has also been developed. These relate to the average answering time, percentage of wrong numbers, character of supervision, etc.

In explanation of the table (p. 263) it may be stated that the first two columns refer to the rule numbers and the last two to the weighting given the several rules. There are various rules for grading companies in accordance with the percentage of compliance with each rule. Thus, in the case of rule 8 for gas service, a perfect compliance (within tolerances) with the state's heating value standard (600 B.t.u.) would receive a grade of 21 per cent, while a grade of perhaps 15 per cent would be given for gas of 575 B.t.u. and a grade of 0 per cent for gas which was less than 550 B.t.u., the allowable minimum. These details need not detain us. It may be remarked, however, that while these

Rules regarding Gas and Electric Service[1]

Rule		Subject	Credit	
Gas	Electric		Gas (Per cent)	Electric (Per cent)
..	14	Creeping meters	..	4
1	15	Allowable error	7	7
..	16	Installation tests	..	5
2	17	Periodic tests	14	14
3	18	Meter testing records	5	5
4	19	Meter testing equipment	5	5
5	20	Request tests	4	4
6	21	Referee tests	..	..
7	22	Meter readings on bills	4	4
8	..	Heating value	21	..
9	..	Calorimeter equipment	7	..
..	23	Interruptions	..	18
..	24	Station records	..	6
10	25	Pressure and voltage variation	18	18
11	26	Pressure and voltage surveys	6	6
12	..	Sulphur restrictions	4	..
13	..	Complaint records	5	..
..	27	Information	..	4
			100	100

requirements do not directly touch upon "efficiency" as that term is used in this study, they do measure one important element of efficiency, viz., the kind of service rendered. It has been found, however, and this is very interesting, that these concrete elements of service do not tell the whole story. The more intangible element of the attitude of the management of the utility and of its employees toward the consuming public has in more recent years been given greater weight. This was pointed out by Commissioner John S. Allen in an address before the Wisconsin Electrical Association at its joint meeting with the Wisconsin Gas Association in 1919:

These rules in only one place, and there rather remotely, sug-

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[1] *Report of Proceedings*, Ninth Annual Convention of the Wisconsin Electrical Association, 1917, p. 73.

> gest anything other than mathematical standards. Since the promulgation of these rules there has been a very noticeable change in the attitude of our organization in the matter of what is good service. That change consists in a fuller realization of the attitude of the public toward the public utility company as indicating the measure of the quality of the service rendered by the company. In other words, without discounting in any way the importance of good voltage regulation, gas of a uniform B.t.u. and other purely mathematical standards, my motive in presenting this matter is to give you my concept of the very great importance of public good will — that less tangible phase of the quality of the service. Good service can only be defined as of such quality, that it pleases and gives satisfaction to the buyer. There comes to mind one utility in Wisconsin which conforms very closely to the mathematical concept of the standards of the commission, yet whose service, due to one curt employee, does not please and give satisfaction to the buyer. On the other hand, numerous instances come to mind, where deficiencies in the mathematical standards are more than made up by a painstaking and studious desire to please.[1]

Through this process of rating and the accompanying inspections the commission is able to keep in close and constant touch with each utility, to note wherein each is weak, to detect deteriorations of the service and to give its approval to such utilities as are improving their service. It ties up the utilities of the state very closely with the commission and causes them to feel that it is constantly regardful of their interest and that of the public served by them. And, as pointed out before, it enables certain state-wide comparisons of utilities to be made and furnishes much useful material for analysis.

Effect of Rating on Companies

The effect of the system on the companies themselves is somewhat difficult to ascertain. The exact ratings are now published, although for a number of years it was not the policy of the commission to do so.[1] The appeal of such a system of grading is primarily to the active day-to-day management. In a sense this appeal is similar to that which the receiving of grades has on children and young men and women in school or college. The commission itself has likened the process to school grading; and while this process of grading utilities was at first looked upon by the utilities as somewhat academic in character, many of them have warmed up to it and have shown a very great interest in it. The appeal to the manager is very direct and certain: a poor showing will cause inquiry on the part of the directorate and will tend to undermine his prestige, unless there are counterweighing circumstances, such as the fact that he had assumed the duties of management recently, or that the company had deliberately adopted a policy of giving poor service and letting the plant run down. The latter would be a rare case and one that would be found only where there was little hope of securing an adequate return on the investment, or where short-sighted financial considerations were placed above the permanent interest of the plant. Professional zeal, emulation, and the feelings of social self-esteem, all would be prompted by a good showing, and a loss of credit and reputation would follow a consistently poor showing. Also the pecuniary motive would be brought into play, since the management could hardly expect an increase in remuneration while maintaining a poor showing.

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[1] *Report of Proceedings,* Eleventh Annual Convention of Wisconsin Electrical Association, 1919, p. 113.

It is of course possible to attach too great importance to this grading device — not to the principle of it, but to the single application of it in Wisconsin. It has never been maturely developed and is still limited to but one aspect of efficiency, namely, the quality of the service rendered.

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[1] The reason assigned for not publishing these grades was that they would be seized upon by a hostile citizen or group of citizens and made the basis of complaints to the commission and of demands for rate reductions, better service, extensions, etc. That they would be such an active ferment of criticism is an indication of the very real importance of this method, if worked out on a large scale.

No account is taken of the cost of rendering that service as measured in dollars and cents and in labor and material consumption. This cost is from our point of view the more essential or fundamental consideration of the two, since service can be and is adapted to the cost of rendering it, and is from many points of view a function of costs. Thus an electric railway service which provided every passenger with a seat during the rush hours would be furnishing ideal service but service too costly to be economical.

The Wisconsin Commission itself has stated on several occasions that it felt the system of grading makes certain positive contributions to the welfare of the utilities and the people of the state. In a letter dated April 13, 1920, it has very kindly supplied us with its estimate of the value of the method:

> We feel that the results obtained in the use of this plan have been very satisfactory and that the managers of utilities whose service has been good are very keen to secure a ranking which is well up toward the top and the managers whose service has not been so good are not particularly proud of the rank near the foot of the column. This department at the start did not intend to make public the rank given to the different utilities as it was expected to use this only for the commission's records but after careful consideration it was thought best to let the utilities and the public know about it and we feel satisfied that this was a step in the right direction.[1]

Extension of the Principle of Public Ratings of Utility Managements

The objection may be raised that conditions vary so from place to place that it is difficult and perhaps impossible to rate the management of individual establishments accurately and fairly. Management itself is, as we have seen, a difficult concept to define and much more difficult to standardize. There is doubtless some truth in this objection, but the practical difficulties are not insuperable. The Wisconsin Commission has itself demonstrated the possibility of ranking utilities on the quality of their service. So far as is known no objections on the score of unfairness and lack of knowledge of local conditions have developed. The frequent inspections of the commissions keep it in sufficiently close touch with local conditions. To transfer this method or a method based on similar principles to the broader field of efficiency in general, as will be advocated in the last chapter, is possibly to step from solid to rather uncertain ground. As has already been pointed out in the present chapter, no formal attempts to work out extended comparisons of efficiency of operation have been made by the commissions, and, as has also been seen, no such attempts would be made or are possible until public utility statistics are made more complete and rational. But with such statistical information and with thoughtful and careful application of the commissions' expert engineers, accountants, and statisticians, coupled with the practical experience which daily contact with utility affairs affords, such ratings of efficiency in the broad sense are possible. We hope to demonstrate this more fully in the last chapter.

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[1] For further commendation of the plan by members of the Commission, see *Proceedings*, Wisconsin Electrical Association, 1917, pp. 75 ff.; 1919, pp. 111 ff. In *Electric Railway Journal*, October 29, 1921, p. 767, it is stated that these ratings "being made public, a keen competition was created among the utilities, resulting in a noticeable betterment of plant and operating conditions."

Before concluding the discussion of this subject some reference may be made to the various forms of rating which are found in the business world to-day. Credit rating and general business rating are familiar practices. Thus Dun and Bradstreet's ratings compress in a relatively few grades (eleven or so) a large number of conflicting considerations. Moody's and others' ratings of securities are very similar. While in a sense these are ratings of the efficiency with which a business establishment is conducted, other considerations do enter in and the ratings themselves are not strictly measures of "efficiency" in the sense in which it is used in this essay. The rating of individual establishments by insurance rating bureaus is also similar in some respects. Thus in a letter from the manager of such a bureau this statement is found:

> The schedule rating system (i.e., the system by which the premiums paid by the insured are related to the risk involved) provides for the giving of credits and debits based upon the conditions of the individual plant. The process of measuring such credits and debits involves the question of compliance with or departures from established standards. The development of a consistent schedule therefore requires the establishment of standards. At the heart of the rating schedule, therefore, from the first has been the standard of safe conditions in industry. These standards are related to the character of industry, the care exercised in the conduct and management of the business or work, the history of the risk in respect to casualties and other conditions — physical or otherwise — under which the business or work of the given establishment is conducted.

This sounds quite similar to the Wisconsin rating system, although it antedates it. Even this kind of rating is simpler than the rating of management as such. The rating of dairies, restaurants, and bakeries by health departments as to their cleanliness and, in the case of dairies, on the butter-fat content of the milk sold, is also similar, although on a much simpler basis than any of the forms of rating so far discussed.

There are, then, in the business world to-day many forms of rating and many instances in which standards of quality and performance are developed and made use of from day to day. None of these, however, covers the entire field of management and few, if any, of them get into the heart of the management problem. In the last chapter we shall dwell at some length upon the problem of developing a system of grading that will evoke the creative instinct in the management. School and college grades rarely accomplish this, principally because they are based on a show of knowledge rather than on creative effort.

The realm of sports seems to afford an example which approaches most closely to the idea here in mind. During the baseball season the individual players are rated on every conceivable angle of the game. These ratings are eagerly read by the baseball public, a very critical body by the way, and constitute the basis of an unmerciful process of elimination and rewarding. These ratings measure numerically the "creative efforts" of a certain class of individuals in whom public glamour and a very painful competitive process provoke strong promptings of the emulative instinct, professional interest, and feeling of social self-esteem. Within a certain limited area they measure the effort, the will to do, of the individual player.

The Recognition of Efficiency in the Regulatory Process

We may turn now to a consideration of the last of the four methods in which regulating commissions can encourage efficiency or discourage inefficiency in utility management at the present time; viz., through the kind of treatment accorded a particular utility when it comes before a commission in a rate case or on any other occasion, such as the hearing of a complaint against its service or when permission to issue new securities is being sought, when the commission is in a position to evaluate the results which the utility is achieving. As already intimated, the character of this treatment, whether liberal or niggardly or indifferent, is shown in a number of different actions or attitudes of the commission. These are principally in its treatment of return on investment and of the valuation or other basis upon which that return is computed. To these major attention will be given. Others are its treatment of the service which the utility is rendering, of competition, of requests for permission to make changes in the amount and character of securities outstanding, and of consolidations or mergers of utilities. There doubtless are other specific instances of the ways in which commissions can "size up" a particular utility, such as their treatment of the problem of surplus and of invested earnings. Some are very intangible and reflect a situation which does not permit of thorough analysis.

English utility companies avoid so far as possible going to Parliament for additional grants of power, for they know that when they are seeking favorable consideration at its hands they are in a particularly vulnerable position. The local authorities may present very annoying demands at such a time and be able to secure their satisfaction.[1] So in this country a utility is commonly in an unfavorable position whenever its affairs are subjected to the critical examination of a commission. It is in fact on trial and suffers all the limitations which attach to a prisoner at the bar. Undoubtedly there have been many instances, especially of late, when all the utility required was a fair hearing to make its just needs and rights known and appreciated. It was then on the offensive with all circumstances favorable to it. Regulation is normally a trial process; it has its legal seat in the police power of the state; the utilities are commonly the defendants and the public the complainants. Service of the public at low costs and maximum profits are the incongruous elements which constitute the situation. If regulation goes beyond this mere trial process and considers efficiency and other matters of like sort, it is "regulation plus." It is not necessary to state that regulation should be of this broader and more constructive type. We have already seen and shall presently see further that regulation is taking on more of this constructive aspect and is functioning more and more as an economic as well as a legal agency.

Through Requirements as to Service

Public utility commissions are constantly passing upon questions of service. The determination of a rate without a determination of the quality of the service rendered would be similar to an individual's agreeing to pay a stipulated sum of money for a commodity without specifying the kind or grade of commodity he expects to receive in return for his outlay. A very large portion of the commissions' time is, then, necessarily devoted to the determination of the quality of service rendered by the utilities under their jurisdiction. Most states which have active commissions now have state-wide service standards. A table showing the extent to which these are found is given as Appendix I. Where there are departures from these standards the utility is obviously derelict in the performance of its duties, and unless excused by the commission because of unusual circumstances is subject to its disapproval. In other states where no state-wide standards are found the commissions, while they may take into consideration local franchise requirements and ordinances, usually fall back upon some rough standard of good service and visit approval or disapproval upon the utility according as it does or does not meet this standard. It is also to be borne in mind, and this is an important consideration, that the commissions cannot compress into a body of rules all of the elements which constitute good service; the intangible matter of "attitude" of the utility toward the public is especially difficult to formulate into a rule and never has been so formulated.

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[1] Whitten, *Regulation of Public Service Companies in Great Britain*, p. 16.

The commissions, then, examine the service rendered by a utility and try to pass upon it as satisfactory, unsatisfactory, very good or very poor. Satisfactory service calls out no special comment on the part of the commissions; unsatisfactory service is required to be improved before favorable consideration will be given to any requests or pleas of the utility; very good service may be noticed or, again, it may not, depending on the commission; very poor service is criticized on the ground that the utility does not merit an average return until it has brought its service up to the average in quality. These various attitudes are evidenced in the following case, selected from numerous cases of like tenor:

> At the hearing on the question of increasing rates testimony was offered by the company tending to show the increase in the cost of coal, labor, etc. . . . The testimony given in the gas service case hearing at Neenah was conclusive that the quality of service rendered is totally inadequate. The standards established by the Commission as to the quality of service are not being complied with. It was freely admitted by the company, through its witnesses, that this service is very unsatisfactory and inadequate. . . . The Commission finds therefore that no increase in rates for gas should be given consideration until the service rendered in the gas department shall conform in a reasonable manner to the standards laid down by the Commission. . . . That no increase in rates for the electric and street railway departments of this utility should be granted until the service in each of them shall be shown to be reasonably satisfactory, and the burden of proof of so doing shall be put on the company. . . . It is further ordered that immediate steps shall be taken for the improvement of the gas service throughout the district. . . . It is further ordered that weekly reports of progress shall be submitted to this Commission.[1]

It is possible, then, through their recognition of good service and their penalization of poor service for the commissions to exert a very direct and potent influence working to improve the quality of the service rendered by utilities. It is perhaps not too much to say that it is in this very respect that the commissions have performed one of their most useful functions. It may be remarked, however, that the commissions have, as a rule, been much readier to criticize poor service than to comment upon and reward good service. This is but a reflection of a natural human failing and is in keeping with the general situation in the field of regulation wherein, as we have seen, constructive work is done by a relatively few commissions.

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[1] City of Neenah *v.* Wisconsin Traction, Light, Heat and Power Co., P.U.R., 1921A, 674.

Through Control of Competition

Another occasion upon which commissions take into consideration the quality of the service rendered by utilities is in connection with the issuance of permits (certificates of public convenience and necessity) for the entrance of a new utility enterprise into a field already occupied by an existing utility. While these cases are numerically less common than the cases last dealt with, they are important as involving the remaining vestiges of the competitive era in utility control. The normal assumption is that a utility which occupies a given field will be allowed to continue to occupy it indefinitely without the competition of one or more like utilities. Thus a gas company serving a given community would not expect to have to share its business with a hitherto non-existent gas company, although of course an electric utility would certainly not be debarred from the field. But such exclusive occupancy is not absolute, particularly in rapidly developing parts of the country and in the case of such utilities as the telephone, where a large national organization is always at hand and ready to come into a local field, and where, perhaps, on economic grounds, it should come in. The control of this matter is in the hands of the commission in most states, through their having the authority to grant or to refuse to grant the necessary certificates showing that public convenience and necessity require the entrance of the new utility into the field. One of the considerations which commissions take into account at such a time is the degree of success which the utility which already occupies the field is attaining. If it is efficient, progressive, and willing to extend its facilities to meet the growing needs of the community, no commission, it might almost be said, would at the present time sanction the entrance of a new enterprise into the field. But the converse is also true and commissions have not been hesitant about granting certificates of public convenience and necessity where conditions are noticeably bad or, more commonly, about calling to task the utility already occupying the field and threatening it with competition, which virtually means complete annihilation, if it does not mend its way. The following cases bring this out clearly:

> It is the policy of the state of New York since the passage of the Public Service Law to protect existing public utilities from unrestricted and ruinous competition, and by efficient regulation to compel them to furnish a high quality of service after being permitted to earn a fair return upon the investment.[1]
>
> A company supplying electric energy was held to be rendering adequate service for a growing city so as to justify the Commission in not opening the field to another company, where the existing company had a reserve capacity of something over 160 per cent of the present demand of the plant [2]
>
> The fact that territory is tributary to an existing electric light company, and that it is operating therein, will not prevent the entrance of another, where the former is operating unlawfully, and has not been diligent in developing the business.[3]

There is, then, considerable practical efficacy in this form of commission control of the quality of utility management.

Through Control of Consolidations

Closely related to this matter is the question of consolidation of existing utilities. Without going into the question in detail the general statement may be made that on occasion a commission may grant permission to companies to consolidate when a greater degree of efficiency will result than hitherto existed. The chief advantages which consolidations give promise of are decreased unit costs due to enlarged output, savings in management and other overhead expenses, a more orderly and rational development of the business, especially in the matter of extensions, a fairer balancing of highly profitable with moderately profitable or unprofitable kinds of business, and a greater

[1] *Re* Ashmead (N.Y. 2d Dist.), P.U.R., 1916D, 10.

[2] *Re* Beaver River Power & Light Co. (Idaho), P.U.R., 1915B, 281.

[3] *Re* Colliers Light, Heat & P. Co. (N.Y. 2d Dist.), P.U.R., 1916C, 212.

specialization of management and direction from the top down, with, finally, the possibility of securing greater managerial and directional ability at the top. The commissions are especially willing to sanction a merger or consolidation when in the given instance it is known in advance that a successful management will take to itself the added work of managing a utility which had formerly not been so well managed. This is pretty much the natural course of things, however, since normally it is the successful enterprise which succeeds to the management of an unsuccessful one. These advantages bear a family resemblance to the advantages which "trusts" are alleged to have and are, it is thought, much more realizable.

An interurban railway was authorized to acquire the stock and bonds of a connecting road where the consolidation would result in its operation as a part of a group of railways under a common management, and would be in furtherance of the public interest.[1]

The consolidation of two electric companies by transfer of all of the property of one to the other was approved where it appeared that the consolidation would make possible more conomical financing and would simplify relations with the public; that the facilities for furnishing and distributing electricity would not thereby be diminished, and no increase in aggregate capital stock or aggregate debt of the two companies would result.[2]

The merger of 5 hydroelectric companies into one large operating company was held not to be in violation of the Idaho anti-monopoly statute (Sessions Laws of 1911, chap. 215), but to inure to the benefit of the consuming public, the investors, and the financial credit of the state, in view of the fact that the Commission has ample power under the Public Utilities act to regulate rates and service, where the utilities were operating at a loss or without any return, and the consolidated company would enjoy, under economies and increased revenue from the merger, sufficient income to yield a reasonable return on a fair valuation of the properties, to enable the public to be adequately served, and to rehabilitate its financial credit.[3]

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[1] *Re* Washington R. & E. Co. (D.C.), P.U.R., 1916C, 516.

[2] *Re* Turners Falls Power & Electric Co. (Mass.), P.U.R., 1915B, 61.

[3] *Re* Merger of Hydroelectric Cos. (Idaho), P.U.R., 1915F, 876.

Through Control of Issuance of Securities

Another of the instances upon which commissions have to take into account the efficiency with which utilities are managed has to do with their control of the security issues of the utilities under their jurisdiction. Nearly all of the commissions have some control over the issuance of securities, this power being given to them on the theory that there is some inherent relation between capitalization and rates. The statutes usually state the purposes for which securities may be issued and require the commissions to see that no departures from the statutory requirements are made and that the money raised is actually applied to the purposes set forth in the petition of the company. Normally a commission cannot withhold its approval of a security issue if the utility asking for it has met the formal requirements of the statute. But there are numerous determinations to be made by a commission in arriving at a conclusion on this subject, and opportunity is thereby afforded for examining into the affairs of the utility, including its past financial history, its present credit status (a direct reflection of managerial ability in the broader sense), its operating efficiency, and the probability that the expenditures to be made from the money raised will be profitable ones. The extent to which the commissions go into these matters depends partly on the importance of the case and the time they have available, but in any event some consideration is given to all of these matters. The net result is that the commissions herein again have an opportunity to pass upon the quality of the management, to discourage inefficiency through refusing to sanction security issues which seem unlikely to be put to profitable use, and, conversely, to place no obstacle in the way of an efficient utility securing funds for developing its business. The practical effect of this work of the commissions is, therefore, to attempt to direct to some extent the uninvested funds of the country from less profitable to more profitable investments. No comment is needed to show the very great significance of this feature of the work of the commissions.

Through Control of Valuation

There is left for analysis the last and probably the most important of the occasions upon which the commissions, through passing judgment upon the quality of the management of the individual utilities under the jurisdiction, can do much to encourage good and discourage poor management. Reference here is, of course, to the determination of the rate of return allowed a utility in a rate case and, secondarily, to the valuation basis upon which this return is computed.

There is no occasion for undertaking in this connection a thorough discussion of the valuation problem in public utility economics. This is a very large subject and is daily taking on new complexities. The greatest part of the attention now given to it by courts, commissions, economists, and others arises from the fundamental bearing of valuation on the whole theory of regulation and on the reconciliation of the claims of private property with those of the public interest, but the proceeding is primarily a legal one. Our present interest, however, is in one particular aspect of the valuation problem, viz., the relation of the valuation process to the attainment of efficiency in the conduct of public utilities, and the discussion of this matter will largely be reduced to the statement of a few principles.

The first and most basic consideration in this connection is the fact that valuation theory and valuation practice have been as potent a force as any in reducing the speculative element in utility management to a low state. This is true partly because such a precise measure by an outside agency of the value of a utility's property unmercifully cuts away fictitious values or values which the companies, perhaps in good faith, think their properties possess. They are not allowed, in other words, to indulge in fanciful imaginings as to the earning powers of their properties. It is true also because all utilities under a given commission's jurisdiction are subjected to the same general principles of valuation, with the result that many of the results of individual good management are entirely overlooked. Thus special advantages due to the strategic location of property or to solidification and unusual profitableness arising from other causes are commonly given little consideration in arriving at a valuation. While it is true that earning capacity can never be made the basis of a valuation, and that the public has to some extent made profitableness possible, exceptional ability should receive some recognition and reward. If it does not it will not be sought out and developed. The public will be in no way advantaged by too parsimonious a policy in this respect.

Attention to Valuation has led to Underemphasis of Problem of Efficient Management

A second principle, really a corollary of the one just stated, is that valuation procedure being, as stated, largely a legal process, has in great measure resulted in the placing of the emphasis in regulation on the protection of property values rather than on the attainment of the service of the public at the lowest possible cost. While duly appreciative of the importance of protecting the utility in its property rights and the public from exploitation through the inflation of the valuations upon which earnings are calculated, one may very well feel that it is of greater importance that the management be efficient and the service good. It is not property that the public is interested in but service, and to obtain good service at the lowest possible cost is a question involving the character of the property investment and of the services of men.[1]

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[1] The view here expressed has recently been attested to by one of the

A third principle can be stated as follows: that basis of valuation will be advocated by the utilities which will result in the largest valuation figure at any given time. Precedents and their own prior views are uncritically sacrificed in an opportunistic program of maximizing the valuation figure.[1] This is quite natural and not improper as the regulation process is carried on at the present time. Thus original cost as against cost of reproduction will be advocated if prices have fallen, and cost of reproduction as against original cost if prices have risen; and, in figuring cost of reproduction, which is the usually accepted basis of valuation at the present time, whether the cost of reproduction at present prices or at an average of prices over a period of years will be used, is likewise determined almost wholly by the desire to obtain a maximum valuation figure. At the time of writing the utilities are making an appeal to the commissions for the use of present prices, which are at a maximum, instead of average prices, the common method.[2]

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newer and more active of the commissions in the following forceful language:

"In the entire scheme of rate making, the valuation of property is only an aid, — a method of approximation. No matter how expensive or how cheap the property of a utility may be, the public is interested only in service, and for that service it should pay a fair price; but it is absurd to contend that enormous sums of money, invested in antiquated equipment, furnishing inadequate service, by ancient methods discarded by the intelligent progress of the art, is entitled to higher rates than better service furnished for less money invested in more cheap, simple and up-to-date equipment; that there is not a large human factor of business management ranging from that [which is ?] highly intelligent, keen, alert, sagacious, popular, progressive and economical to that which is dull, bull-headed and shiftless, which in most cases determines the success or failure of the utility.

"How far is the public to be benefited by the one, or penalized by the other? The factor of management has more to do with earnings than all the hypothetical reproduction and conjectural depreciation compiled by all the engineers and commission that have considered them. . . ."

(Commissioner Potter, *Re* Michigan State Telephone Co., P.U.R., 1921C, 549–50.)

[1] Cf., for example, Nash, L. R., "Valuation for Rate-making Purposes," *Stone & Webster Journal*, December, 1920.

[2] There is perhaps no aspect of valuation which is so lacking in princi-

In so far as utilities are able to follow out such an opportunistic program the speculative element is, to a certain extent, retained in the regulatory process.

No Generic Relationship between Valuation and the Promotion of Efficiency

It may reasonably be asked what, if any, connection there is between the principal bases of valuation and the recognition and promotion of efficiency. There probably is no generic relationship. Any basis of valuation must be tempered with a degree of reasonableness. Thus the original cost theory presupposes that the property acquired was necessary and that the costs were not in excess of those which prudent business management would have incurred. Likewise, in estimating the cost of reproduction, property that is not needed for utility purposes is excluded and property that is greatly depreciated in value, as through long use, is written down to a low figure. The "substitute-plant" theory does, however, have the effect of comparing a given facility with a more efficient facility which improvements in the arts have produced. The effect of this theory is "to give the public the advantage of savings from increased economy under present knowledge and present conditions."[1]

It is often said in valuation cases that one hundred per cent "plant efficiency" is entitled to a one hundred per cent valuation, that is, to a valuation of the property as new without a deduction of accrued depreciation.[2] The commissions quite properly distinguish between the efficiency of the physical property and the value which inheres in that property. However, this is not to say that the de-

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ples as this one. Engineers make the most arbitrary assumptions as to the course of prices and yet argue with an amazing degree of finality.

[1] Hartman, H. H., *Fair Value*, p. 105.

[2] See, for example, Chesapeake and Potomac Telephone Co. (Md.), P.U.R., 1916C, 925; also Blood, W. H., Jr., "The Passing of Depreciated Value in Rate Cases," *Stone & Webster Journal*, December, 1921.

duction of accrued depreciation may not work hardships in particular cases. This is rather a problem of the relative equities of past and present owners of the securities of a utility and the consuming public than a question pertinent to this inquiry.

Valuation of utilities after two or more decades of experimentation is still strikingly indefinite. In the eyes of many the net result of valuation practice has been to cause "a decline in the character or excellence of the service" rendered by public utilities.[1] Whether or not there has been such a prolonged undervaluation of utility property is partly a question of fact and partly one of principle. There can be no doubt that, given the fact of undervaluation, the result above noted will follow, for the impairment of the capital assets of a utility strikes at the very roots of its existence. The facts of the case are obviously beyond ready answer at this time.

Treatment of "Overheads"

But, aside from being indefinite in the determination of the principles which underlie it, there are certain very indefinite items which would still remain indefinite if principles had been developed which were as immutable as the laws of physical science. These items are the so-called "non-physical elements affecting value" and "going value." These are elements of value which permit of no exact determination but are largely dependent on the judgment and to some extent on the wishes of those who are making the valuation. They are the elements of a valuation which require the greatest scrutiny and, aside from the selection of the principle or basis of valuation itself, offer the greatest opportunity for a commission to expand or contract the valuation basis in accordance with either its own predetermined notion of what the utility is entitled to or with the degree of efficiency shown in its management.

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[1] Cf. Leonard Metcalf, *Journal of American Water Works Association,* November, 1919, p. 786.

The non-physical elements affecting value are principally the so-called "overhead expenses," including engineering and supervision, legal and organization expenses, interest and taxes during construction, promotion expenses and working capital; other intangibles are bond discount, brokerage, paving over mains, and adaptation and solidification. Where the commission requires a separate presentation of each of these items and clear proof that the expenditures claimed were actually made and does not allow simply a rough percentage in addition to the value placed on the physical property (plus going value, possibly), no special difficulties are involved. But utility engineers and counsel are insistent upon the use of some more or less arbitrary figure (such as ten or twelve per cent), unmindful of the actual expenditures in the given case. It is through the too uncritical allowance of overhead expenses that some of the "padding" of valuations is accomplished. Thus the Illinois Public Utilities Commission in City of Lincoln *v.* Lincoln Water and Light Company, refers to the overhead expenses as "the cloak under which hides a multitude of iniquities."[1] The determination of the length of the construction period is also a matter of considerable difficulty and admits of considerable manipulation. In any of a number of such ways commissions can, and do, add to the valuation basis of a utility which for one reason or another they feel to be especially meritorious or deserving.

Somewhat closely related is the matter of the treatment of obsolescent property. Both in the course of a valuation and in the course of the regular accounting control commissions can do much which will affect the efficiency of utility management through their policy as to obsolescent property. Obsolescence is an element of depreciation and should be fully taken care of in the depreciation allowance. But it happens oftentimes that property which was obsolescent had accumulated before commission regulation began, or has accumulated since, either because of an unexpectedly rapid development of the arts or because the commission's depreciation allowance was inadequate or the company's earnings insufficient fully to meet this element of cost. If under such circumstances the commission's allowance either in the depreciation account or in a valuation is too narrow and restricted, it will result in a decided slowing up of the making of improvements and perhaps will work grave injury both to the public and the utility through discouraging that searching for economy-producing agencies which characterizes uncontrolled private industry. Our reference to this subject here is necessarily very brief and incomplete and is intended only to convey the impression that a danger lurks in this particular phase of the process of regulation.

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[1] IV Ill. P.U.C. Opinions and Orders, 634.

Going Value

The question of what, if any, allowance is to be made for "going value" is of very great importance. In it are involved not only an "element of elasticity" similar to that referred to in the discussion of the "non-physical elements of value," but additional considerations of even greater significance. "Going value" or "going concern value" has been picturesquely defined by a well-known valuation engineer, Mr. J. W. Alvord, as "the time handicap in the race for an income." [1]

> The going value of a utility is to be determined only on a basis of off-setting annually against actual gross earnings all bona fide operating expenses, including repairs, maintenance, taxes, reasonable annual depreciation charge, and a fair return on the investment, during all the years since the inception of the utility, provided the project is properly conceived and an undue period

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[1] *Public Service,* January, 1920, p. 15.

has not been required to develop the business on a paying basis, the amount of excess of annual deficits over surpluses at the time of the valuation being capitalizable as "going value." [1]

It is, in other words, an allowance in the valuation for losses sustained during the period preceding the time when the utility has developed a paying business. As commonly used and allowed at the present time it constitutes the difference between what the utility would have earned if it had been on a paying basis from its inception and what it did earn during this development period. It is not to be confused with good will, although it cannot be denied that there is a family resemblance between the two. Some valuation engineers have of late argued that even a public utility can be rightfully said to possess a going value in the sense of good will.[2]

Going value in the sense first mentioned is becoming, however, a factor quite commonly reckoned with. In Wisconsin practice a slightly different application of the term is found. Whereas ordinarily an allowance for going value is determined at the initial valuation of a property and is not amortized or otherwise changed after the business is put on a profitable basis, in Wisconsin any legitimate losses incurred at any time can be charged against the rates and be reimbursed by the consuming public.

At first sight an allowance of going value would seem to be a concession to weakness and inefficiency since the amount of such allowance is inversely proportional to the early success with which the business was managed. There undoubtedly is some truth in this view, since nothing would seem more natural than to check one's fear of personal loss when assurance is given that such loss will be charged up to the business and borne by its people. A counter consideration, however, is the fact that, with the exception of the Wisconsin interpretation of the term, the losses were incurred as a rule before the recognition of going value by the commissions and courts, and hence the enervating influence here referred to was as a matter of historical fact non-existent. Another consideration, and in fact the principal justification of going value allowances, is the fact that utility companies, being limited in the profits they may make, have no surplus earnings through which losses can be absorbed. "A fair return on the fair value of the property used and useful for the service of the public" not improperly implies that in the "fair value of the property" shall be included all expenditures which were necessary to place such property in a position to serve the public.

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[1] Belleville *v.* St. Clair County Gas & E. Co. (Ill.), P.U.R., 1915F, 235.

[2] Cf. testimony of W. J. Hagenah in case of Lafayette (Ind.) Home Telephone Co., P.U.R., 1920A, 428.

Going value is, then, a factor which has two bearings on the efficiency with which utilities are managed. It tends to excuse losses and to that extent weakens the influence of the "pain stimulus"; in so far as this is the case any allowance for it should be most rigorously and vigilantly scrutinized by the commissions in making it and by the public in accepting it. It should also be made the determined policy of the commissions not to allow it except for losses legitimately incurred. The commissions have quite properly put the burden of proof upon the companies seeking allowances for going value and to the extent that this policy has been adhered to have done about all they can be expected to do in this respect to check the tendency to wasteful or unguarded expenditures.[1] The second aspect relates back to the discussion of the allowances for the non-physical elements of value. If the commission wishes to be generous or niggardly in its treatment of a utility in the course of arriving at a valuation of its property for rate-making purposes, it can do so through its allowance of much, little or nothing for these elastic elements of value. Sometimes the commission's attitude in a given case is unconsciously assumed and reflects its general notion of the merit or demerits, including the efficiency or inefficiency, of the utility in question. In other cases it may arrive at the same result through a deliberate process of reasoning, although perhaps the various stages in this process are not made known to the public. No special censure of the commissions is implied in this remark. The result is but the outcome of a very complex interplay of forces, and is perhaps no more unnatural than many of the other compromises between absolute and relative justice which the public regulation of private profits involves.[1]

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[1] "While the facts which have been presented indicate that the cost of building up the business of a plant is an element that should be considered in determining its value for rate-making purposes, it is, of course, a fact that these expenditures or deficits must be legitimate and reasonable. They should not include items that have been incurred under other than usual conditions, or items that could have been avoided by the exercise of ordinary care and business judgment." (Wisc. R.C. Digest, 496. Hill *et al. v.* Antigo W. Co., 1909, 3 W.R.C. Reports, 623, 715; Journal Prtg. Co. *et al. v.* Madison Gas & El. Co., 1910, 4 W.R.C. Reports, 501, 585–86; and a number of other cases.)

Allowance for Exceptional Efficiency should not be Concealed in Rate Base

But [illegible] much more wholesome tendency is appearing at the present time, one that is more open and candid and therefore certain to produce better results in every respect. Instead of covering up extra allowances in the valuation basis the commissions are tending now to make their allowances for uncommon efficiency and their penalties for inefficiency in the rate of return, keeping the valuation itself clear of these dubious elements.[2] We can, then, turn at once to a consideration of the last topic in the present chapter, namely, the use of the return allowance as a means of recognizing and rewarding and therefore of promoting efficiency in utility management. The preceding discussion of valuation has, it is hoped, prepared the way for a ready treatment of this subject.

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[1] Similar in some respects is the problem of the allowance made in valuation proceedings for property acquired through surplus, i.e., generally speaking, from earnings in excess of a fair rate of return. In so far as this question involves closed transactions it can have no bearing on the problem of securing and rewarding efficiency. If looked upon as a continuing process it is fully covered by our discussion of the degree of liberality shown in making valuations. In any event, such property is anomalous under a matured system of utility regulation.

[2] Some recognition of this result is contained in this quotation: "Obviously the nominal rate of return will decrease [illegible] the amount of 'intan-

Rewarding Superior Efficiency through Control of Rate of Return

The usual procedure in a rate case may be reduced to the following primary elements: (1) a determination of the fair value of the property in question; (2) a determination of the cost of rendering the service to the public, including a consideration of the reasonableness of such costs, usually by comparison with the costs of other utilities similarly circumstanced; (3) a consideration of the value of the service, including a determination of the quality of the service; (4) a consideration of any exceptional circumstances arising out of local conditions, historical circumstances, and the like; and (5) the determination of a rate schedule that will yield (6) such a rate of return as the commission in the given case feels is deserved. Each of these matters has been discussed as fully as its importance warranted, with the exception of the last. No special consideration has been given to local and other special circumstances, as they have been found to be too diverse in character to permit of generalization.

gibles' added to the capital is increased, and if enough is added, net returns will apparently disappear entirely and nominal deficits take the place of existing rates of profits." (Payne *et al. v.* Wis. Tel. Co., 1909, 4 W.R.C. Reports, 1, 65.)

Or again in this one: "In contrast to many electric plants in North Dakota, the Hughes and Deiters plant is economically managed. The Commission believes that successful management, modern facilities, and economical and efficient operation should not be penalized, but should be encouraged directly by increasing the rate of return rather than by indirection through the creation of a mythical value." (Barth *v.* Hughes and Deiters Electric Co., North Dakota Board of Railroad Commissioners, P.U.R., 1922A, 749.)

A growing number of the commissions have come to realize the very great importance of stimulating efficiency. The development and expansion of procedure in their treatment of efficiency will be sketched presently. Let us first attempt to visualize the steps by which members of the state commissions have arrived at their present position.

In the course of their work various complaints come before them for the determination of matters of rates, service, capitalization, etc. Some companies are seen to be more intelligently and energetically managed than others, to produce at lower costs, to secure better coöperation with the public, and in other ways to be sounder business enterprises. For a long period of time the commissions appear to have been almost entirely oblivious to this fact; inefficient and efficient companies were treated alike to a large extent. The deadening effect of the decision in Smyth *v.* Ames, whereby a utility is limited to "a fair return on the fair value of the property being used for the convenience of the public," was not so apparent then as it is now. Any differentiation between efficient and inefficient companies that there may have been was of a negative rather than of a positive character. That is to say, inefficiency was penalized while efficiency was not singled out for special commendation and reward.

Evidence of Extent to which Commissions so Reward Superior Efficiency

With the accumulation of experience and the tightening up of economic conditions the commissions have had brought to their attention the need for and the possibility of differentiating between companies showing different degrees of efficiency. This change of attitude and increased refinement of treatment may very properly be attributed to the commissions' growing realization of the very serious defect in the regulatory process which the failure to distinguish between efficiency and inefficiency entailed. There has therefore been a gradual accumulation of cases wherein the principle is unmistakably asserted that special efficiency merits special consideration. It is not possible to trace this development in great detail; nor is it necessary to do so, since the present interest is more in the establishment of the fact that the commissions have definitely embraced a change of attitude in their dealings with utilities than in a detailed historical account of the development of this attitude. A valuable contribution to public utility economics would, however, result from such an historical account, and it is hoped that at some other time a more extended treatment of this particular phase of the present treatise may be made than is now possible, in view of space limitations and the necessity of keeping the various parts of it in their proper proportions. The treatment here will therefore be limited to the citation of cases from a number of different jurisdictions, in order to show the wide distribution of the view that special efficiency merits special consideration and that the way to reward it is through some variation of or addition to the rate of return. Assuming, as we may in view of the foregoing analysis, that the valuation has been properly arrived at and contains no special elements as compensation for good management, and that service is not unsatisfactory, or in other words that the other factors in the equation are constant, we may turn to a consideration of this matter of rate of return allowed.

At many points in the present paper mention has been made of the obvious fact that the return on the investment of a regulated utility is commonly limited to something which approximates the rate of interest, or, if by rate of interest "pure interest" is meant, then, in addition to it, a return for the expense of procuring capital and for the risks involved. The rate of interest fluctuates considerably from time to time and varies a good deal from place to place. No commission has discussed the interest question so ably and completely as the Wisconsin Railroad Commission.[1] But with this part of the return we have no immediate concern, since it is assumed as a starting-point that the payment of at least the normal rate of interest is necessary. That the rate of return has been customarily limited by the courts and commissions to a figure which hovered around the commercial interest rate is shown by the fact that until 1911 the courts had allowed over six per cent in only two cases.[2] The cases in which the commissions have established a definite rate of return are very numerous. Using Whitten's summary for the period to 1911 it is found that the commissions' allowances have been somewhat larger than those of the courts. Since 1911 the courts' allowances have been larger (a fact which Whitten attributes partly to the influence of the commissions), although not necessarily more liberal. The courts' determinations in this respect are due to their interpretation of their duty to protect property. Such protection is accomplished, they argue, if the legal rate of interest is allowed, but it is to be noted that the courts are more liberal in their valuation allowances, for this same reason. The commissions tend to be less liberal in making valuations, largely because of their greater ability to ascertain and study the facts than that possessed by the courts, and more liberal in the matter of allowance of return on valuation. Their point of view contains more of the commercial or business rather than the legal element. A distinction between a judicial and an administrative point of view is sometimes made in this connection.[3] Thus, as the Nebraska Railway Commission said in the case of City of Havelock *v.* the Lincoln Traction Company:

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[1] See, for example, State Journal Printing Company *v.* Madison Gas and Electric Company, 4 W.R.C. Reports, 633 ff.

[2] Whitten, *Valuation of Public Service Corporations*, p. 689.

[3] See Whitten, *Valuation of Public Service Corporations*, p. 690, and cases there cited.

> The Commission must protect the public against unjust charges for services, discrimination and inadequate facilities, and at the same time give encouragement to the introduction and maintenance of such utilities as are demanded by the economic conditions of the community. In other words, the Commission's primary function is not that of protecting property from confiscation, but rather that of encouraging the development of such utilities as the best interests of the community demand, at the same time conserving the rights of the public in their establishment.[1]

Another very common statement of this same point is the familiar one that the return should be sufficient to attract the necessary capital into the enterprise. In fact, to many this seems to be the only standard of reasonableness needed; if nothing is done unduly to impede the flow of capital into a given industry — if, in other words, the workings of natural competitive forces are not hindered in any way — all necessary remuneration of the capital invested is accomplished. A typical decision of this kind is here given:

> In fixing a maximum rate of return, consideration should be given the legal rate of interest, the current market rates for money, the customary rates obtainable on investments in similar enterprises, the nature of the business, the hazards, and whether the return will attract new capital.[2]

There is much to be said for this view, for it covers a multitude of considerations. Risk, local and national, possibly international investment conditions, the credit of the management and the outlook of the undertaking are all covered. But for present purposes such a standard of reasonableness is too general and indefinite to be of great analytical value. We shall therefore pass to a consideration of those specific allowances which the commissions make in addition to the usual interest allowance.

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[1] 4 Nebraska State Railway Commission Reports, p. 95 (1911).

[2] Maryland Public Service Commission *re* Chesapeake and Potomac Telephone Co., P.U.R., 1916C, 925.

Decisions of Wisconsin Railroad Commission

Two decisions of the Wisconsin Railroad Commission may first be cited, not because they antedate similar decisions elsewhere but because the Wisconsin Commission is historically one of the oldest commissions and was from its inception made up of men who were particularly inclined to give consideration to all the economic ramifications of their decisions. In 1912, in the case of City of Milwaukee *v.* The Milwaukee Electric Light Company,[1] the Commission said:

> A feature of considerable importance is the rate of return to efficient management. In determining the return to the management some allowance should be made in some manner for special efficiency. To deny this is to take away one of the greatest incentives to economy.

In another decision this Commission expounded this theory at greater length.

> . . . In many of its decisions where the conditions were normal the Commission has found the reasonable rate of return to which utilities should be entitled to be from 7 to 8 per cent of the fair value of the property and business. We believe that in the present case, as for other telephone utilities similarly situated, the latter rate of return is fully justified, not only by the facts which we have mentioned but by other conditions. We cannot escape notice of the fact that the Milwaukee exchange of the Wisconsin Telephone Company has been and is managed with an exceedingly high degree of efficiency. The efficiency obtained in the Milwaukee exchange is shown both by the fact that the investment in Milwaukee is very low for an exchange of its size and nature, and that the operating expenses appear to be very conservative. This efficiency, it seems, is a result both of the efforts of the officials of the Wisconsin Telephone Company and of the relation between the Wisconsin Telephone Company and the American Telephone and Telegraph Company. It may be argued that every public utility is expected to conduct its business in a reasonably efficient manner, and this, of course, is true; but

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[1] 11 W.R.C. Reports.

> we are dealing in the present case with what seems to be an instance of unusual efficiency, manifested not only in the degree of economy obtained in the construction, operation, and maintenance of the plant, but in the relations which the company has established and maintained with the public. As far as we can determine, the officials of the Milwaukee exchange and of the company have been continually on the alert to discover means of conducting the business economically and maintaining desirable relations with the public.
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> The importance of giving consideration to the character of the management in fixing upon the fair rate of return, is stated by the supreme court of Wisconsin in Duluth Street Railway Co. *v.* Railroad Commission, 161 Wis. 245, 261, as follows:
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> "The amount of this return should be governed to some extent by the character of the management. A company that is on the alert to practice economies should have some part of the saving, else there would be no inducement to reduce the cost of the service."[1]

In these decisions the assumption is that the public no less than the company profits through such a reward for efficiency, that the increment of wealth produced more than offsets the added return allowed the company. In some cases the issue here mentioned has been presented with sufficient force to require open comment upon it. Thus in City of Milwaukee *v.* Milwaukee Gas Light Company[2] the Commission said:

> It appears that the so-called "booster system," a system of high pressure transmission of gas developed by the respondent in the instant case and installed by it in place of the ordinary low pressure system previously used, has resulted in some saving of investment for the utility. It seems reasonable that the unusual skill and foresight exercised by the utility should receive some reward. It is doubtful, however, if the entire estimated saving should accrue to the utility, for the consumer would thereby be denied any share in the progress of the industry.

Similar views are expressed in the cases of City of Rhinelander *v.* Rhinelander Lighting Company[3] and in *Re* Application Rhinelander Printing Company.[1] These decisions may be said to be typical of commission decisions on this point throughout the country.

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[1] 17 W.R.C. Reports, 596–98 (1917).

[2] 12 W.R.C. Reports, 441, 453–54 (1913).

[3] 9 W.R.C. Reports, 406, 424, 426 (1912).

Decisions of Massachusetts Commissions

The Massachusetts commissions have likewise specifically referred to the propriety of recognizing and rewarding special efficiency. Thus the Board of Gas and Electric Light Commissioners said in *Re* Lawrence Gas Company:[2]

> While the Board has not been disposed to criticize or interfere with liberal dividends properly and fairly earned by progressive and efficient management, it has regarded such dividends as a reward rather than as a right, and certainly not as creating of itself the excuse for the maintenance of a price.

Likewise the Massachusetts Public Service Commission has said:

> It is not true, in our judgment, that a system of public utility regulation is wholly inexpedient and impracticable, in which, to use the words of the Middlesex and Boston case, a premium is put upon good management but discouraging condemnation is visited upon bad management, and in which, if there is mismanagement causing loss, such loss must be charged against the stockholders legally responsible for the mismanagement.[3]

It should be noted that in both this decision and the Wisconsin decisions the commissions are seen to be on the defensive. Reference has already been made to the ever-present public opposition to any such allowances on the score that they represent pandering to the utility interests.

Other Similar Decisions

Two of the newer western commissions have expressed themselves in a manner very similar to that of the more mature commissions whose decisions have been quoted. Thus in the case of Arizona Corporation Commission *v.* Morenci Water Company,[1] the Commission said:

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[1] 15 W.R.C. Reports, 783, 809 (1915).

[2] P.U.R., 1915A, 818.

[3] 4 Mass. P.S.C. Reports, part I, p. 62; cf. also Bay State Street Railway Company Case, P.U.R., 1918A, 847.

> As noted elsewhere in this report, respondent operates at high efficiency as compared with other pumping plants. This is due in part to favorable loading conditions, but is also due in a large measure to able management and to competent engineering in the design of the plant. It seems proper to encourage and promote such a character of management as will produce economy in operation, and it follows that any savings due to exceptionally skilful management should be shared by company and consumers.

The Idaho Public Utilities Commission in Sandpoint *v.* Water and Light Company,[2] expressed itself in no doubtful terms as to the necessity of furnishing some incentive for special effort.

> This Commission will not be placed in a position of stifling ambition and effort in the development of public utility enterprises by adopting a fixed per centum as the rate of return which a utility shall be allowed on its investment. The rate of return will be determined in each individual case, giving due consideration to efficiency and economy in management, and thus afford a stimulus for the utility to increase its business, to reduce its operating expenses, and thereby reduce the cost of the commodity to the consumer. If a public utility can by efficient management reduce the operating expenses below the ordinary amount, or if it can by the application of a broad and public spirited policy develop a community and thereby develop its business and increase its earnings, it is certainly entitled to share in the increased earnings directly resulting therefrom. We believe that the application of this policy will create an incentive to greater and more efficient effort on the part of the investor, and that it will redound to the benefit of the community served as well as of the entire state. The Commission finds that eight per cent per annum is a reasonable return on the investment now under consideration.

And again, in Taylor *v.* Northwest Light and Water Company,[3] it spoke as follows:

[1] P.U.R., 1915C, 546.

[2] P.U.R., 1915F, 466.

[3] P.U.R., 1916A, 372.

> The rate of return will be determined by the Idaho Commission in each case after due consideration of the hazard, risk, and efficiency of operation and of the economy in management, the highest rate being given to the utility showing the highest efficiency and the greatest economy in operation, and furnishing service at the lowest possible cost.

The Indiana Public Utilities Commission thus expressed itself on this subject in *Re* Indiana General Service Company:[1]

> A utility which is operated efficiently, as this one appears to be, and which is giving good service, should be allowed a higher return than one which is giving poor service through bad methods of operation. Its initiative and its successful efforts to furnish good service at a minimum cost to its patrons should be recognized and encouraged by a higher rate of return than would otherwise be allowed. . . . An exceptionally high efficiency of operation is indicated by probably the lowest coal consumption in the state, and the fine condition of its books is to be commended.

And the Ohio Public Utilities Commission as follows:

> The Commission would be most reluctant to grant any increase to the applicant company at this time in view of the present day conditions, were it not for the fact that the testimony adduced at the hearings and the admission of counsel for the city conclusively discloses that the service of the Lima Company is equal to, if not the most efficient and satisfactory of any telephone company in this country. . . .
>
> We believe, and it is our judgment, that honest, economical and efficient administration of the affairs of a public utility should be commended by us, and should be considered in deciding the amount of a fair rate of return upon the company's property, since to hold otherwise would be but to penalize economical, efficient and honest management, and encourage extravagance and lax methods in the management thereof . . . in arriving at our conclusions herein have given due consideration to these facts.[2]

Leading Decisions of Illinois Public Utilities Commission

Of all the commissions which are paying attention to this question of efficiency none has done so more assiduously than and so persistently as the Illinois Public Utilities Commission. Commissioner W. A. Shaw, at one time a president of the National Association of Railway and Utilities Commissioners, in his decisions has consistently maintained that efficiency should be rewarded and the results of it shared equitably between the utility and the public. In City of Lincoln *v.* Lincoln Water and Light Company,[1] Commissioner Shaw gives a complete setting forth of his views.

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[1] P.U.R., 1921A, 342.

[2] City of Lima *v.* Lima Telephone & Telegraph Co., P.U.R., 1922A, 155.

> A utility which is excellently managed, progressive in development, alive to the public requirements, aggressive in securing new business, economical in operation, courteous to consumers, and fundamentally honest in all transactions, should receive greater consideration in the fixing of a fair rate-of-return than should a utility of which the reverse is true. . . .
>
> Regulatory bodies are oftentimes confronted with the queries: "How is meritorious operation and management of utility property to be rewarded?" "Is the public alone to be the recipient of all gains effected through the skilful and diligent efforts on the part of a utility's management?" "Must a utility be content with a continued nominal rate-of-return with no hope of increased earnings to reward it for a creditable showing?" "Would not such a condition of affairs be conducive to extravagant expenditures and riotous management on the part of the utility's officials?" This Commission is frank to say that it believes it to be a niggardly policy indeed, between public and utility, under the modern doctrine of state regulation, to drive the latter's profit to the extreme minimum limit. Conversely, the Commission is also of the belief, that in general, the utilities should be somewhat more reasonable in claims which tend to drive profits to the upper extreme of the range. Much of the customary claims of utilities for "going value" probably would disappear were it commonly understood that reward for excellent operation is not to be found in an intangible enhancement of capital, but instead, in an adequate rate-of-return which is commensurate with efficacious service. This Commission, once it has fixed a reasonable rate-of-return in a rate case, is agreeable at any future date to consider an increase in the said return, based upon proper and adequate showing by the utility, whose

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[1] IV Ill. P.U.C. Opinions and Orders, 667, 669 (1917).

rates have once been subject to review regarding exceptional operating performances after the close of the original rate case — in other words, to re-proportion upon future rate readjustment, further savings made by the utility's management between increased profits to the stockholders and reduced rates to the consumers, rather than to declare that all such further savings should accrue solely to the public. In the case at bar, the rate-of-return fixed herein reflects the Commission's judgment of the respondent's past and present efficiency of operation and management. In the immediate future the respondent will probably be able to effect economies of operation and management which would enable it to increase its income; and such increase of income, it is ordinarily conceded, in the absence of further rate investigation, may be declared as dividends by the utility. But it is a great fear on the part of the utilities generally that any showing of earnings greater than that controlled by the rate-of-return fixed by the commission's order will be seized upon as an opportunity of further complaint and rate investigation. Undoubtedly such investigation would be warranted frequently, if the utility's attitude is continuously to take all the profits and to share nothing with their consumers. It is not fair, however, that all savings effected by efficiency of operation and management (in contrast to those savings which may result from economic and other conditions which may be extraneous to the utility's management and operation) should accrue to the consumers alone. Were such to be the outlook, the future would hold little incentive to the utilities to increase their efficiency of operation and management. Instead, there would exist incentive for inefficiency. The public, from time to time, is demanding improved utility service, and more of it; and for first-class service the public is invariably willing to pay adequate and remunerative rates. Between these two extremes, viz., the utility taking all future savings, or the public taking all the savings, there appears to be a happy middle course which takes cognizance of both points of view. Should the utility be able to show marked savings due directly to efficiency of operation and management, it is entitled, upon a readjustment of rates, to an increase in the rate-of-return fixed in the initial rate investigation, provided the said utility exhibits a willingness to share its savings with its consumers by making future rate reductions from time to time.[1]

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[1] Similar but less extended decisions of this commission are found in City of Pekin *v.* Pekin Water Works Company, IV Ill. P.U.C. Opinions, 784–809; Union Gas and Electric Company case, V Ill. P.U.C. Opinions,

Enough cases have been cited to establish beyond doubt the existence of a desire on the part of a large number of the commissions to give consideration to questions of efficiency.

The problem is no different in the case of railways from what it is in the case of local utilities, and is in fact perhaps more acute in their case at the present time. The Interstate Commerce Commission through Commissioner Lane expressed its view on this subject in very forceful language in the Advance in Rates-Western Case, as follows:

> A premium must be put upon efficiency in the operation of the American railroad. Rates cannot be increased with each new demand of labor or because of wasteful, corrupt, or indifferent management. Nor should rates be reduced with each succeeding improvement in method. Society should not take from the wisely managed railroad the benefits which flow from the foresight, skill, and planned coöperation of its working force. We may ruin our railroads by permitting them to impose each new burden of obligation upon the shipper. And we can make no less sure of their economic destruction by taking from them what is theirs by right of efficiency of operation — the elimination of false motion, of unneeded effort, and the conservation of labor and materials. The standard of rates must be so high that the needed carrier which serves its public with honesty and reasonable effort may live. And yet rates should still be so much below the *possible*

205; *Re* Monmouth Public Service Company, *ibid.*, 229; *Re* Peoples' Power Company, *ibid.*, 606; *Re* Little York Electric Company, P.U.R., 1918B, 120; and in *Re* Champaign and Urbana Water Company, P.U.R., 1919E, 827. While in most of these cases the commission did not allow anything extra, since unusual efficiency was not found to exist, in the case of the Monmouth Public Service Company it did allow an eight per cent return because of "efficient and able" operation.

Other cases in point are *Re* Indianapolis Traction and Transportation Company, P.U.R., 1919B, 152; *Re* Mountain States Telephone and Telegraph Company, P.U.R., 1917B, 198 (Colorado Commission); Osceola *v.* Osceola Light and Water Company, P.U.R., 1919C, 112 (Missouri Commission); *Re* Cleveland Electric Illuminating Company, P.U.R., 1919A, 604 (Ohio Commission); Hoffman *v.* Elmira Water, Light & Railway Company, P.U.R., 1921D, 535 (New York Commission, Second District); and *Re* Franklin Light and Power Co., P.U.R., 1922A, 517 (New Hampshire Commission).

maximum as to give high and exceptional reward to the especially capable management, the well-coördinated force and plant. This is the ideal, unrealizable perhaps, but it points the way.[1]

Besides these formal expressions of the commissions in rate cases there has been a growing body of such utterances by individual commissioners. Thus W. D. B. Ainey, Chairman of the Pennsylvania Public Service Commission, said in testifying before the Federal Electric Railways Commission:

> . . . Upon that fair value, every company is entitled to receive a fair rate of return, in addition to the costs of operation . . . and, I am quite content to add, an allowance when tangibly expressed for economies in operation. I believe these allowances should be generous and not trimmed to the bone.[2]

On another occasion Mr. Ainey is quoted as having said that

> it was his belief that there was something radically wrong in not giving compensation or recognition to the well-regulated and operated property as compared with the return to the poorly managed property . . . there must be some formula which will recognize good management and bring back an incentive for that. . . . The company should not have to strive for efficient management with the motive of preserving life, but to the end of earning more for the stockholders, provided that the public would likewise benefit through such economy and efficiency in operation.[3]

Likewise G. R. C. Wiles, Chairman of the West Virginia Public Service Commission, in an address delivered before the West Virginia Gas Association in July, 1919, said:

> It seems manifest that commissions and courts must take into consideration, in arriving at just and reasonable rates, not only the value of the investment, but the character, quality, and value of the service, the risk and hazard of the business, and the skill, integrity, judgment, and prudence displayed in the con-

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[1] Interstate Commerce Commission Reports, vol. xx, p. 334.

[2] *Electric Railway Journal*, August 23, 1919, p. 388.

[3] *Ibid.*, July 6, 1919, p. 14.

> struction and operation of the plant; to do otherwise would be to unjustly discriminate as between utilities skillfully, prudently, and economically constructed and managed and utilities unwisely and improperly constructed and extravagantly and inefficiently operated. Any other course would take away every incentive on the part of the management to excel in the character of service furnished or quality of the commodity supplied and encourage extravagant and wasteful operating methods.[1]

Finally, the Committee on Public Utility Rates of the National Association of Railway and Utilities Commissioners in its report for 1917 said:

> The amount of return should be such as to provide for the cost of economical and efficient operation, taxes, depreciation, a fair return on the fair value of the property devoted to public use, and a proper margin for the successful conduct of the business. *Exceptional efficiency of management should receive consideration and encouragement.*[2]

When it is recalled with what care and deliberation these reports are drawn and discussed by the Association, this statement may be said to be of fundamental importance. The committee presenting it consisted of representatives of the states of Indiana, Michigan, Nevada, New Hampshire, Pennsylvania, West Virginia, and Wisconsin.

Real Meaning and Practicability of these Decisions and Declarations of Opinion

It may reasonably be asked whether these declarations of the state commissions found in their decisions and in the less formal utterances of their members, really promise anything effective in the way of a solution of our public utility problems. The answering of this question is exceedingly difficult.

Stubborn critics of commission regulation may question the genuineness of this growing emphasis of efficiency, saying that the commissions are beholden to the utilities over which they purport to exercise jurisdiction and that the granting of an extra per cent of return as a reward for efficiency is merely a subterfuge by means of which undue liberality in the treatment of utilities is hidden from view. While there is something natural about such a criticism, since it is difficult to dissociate such apparent liberality from suspicion of connivance, still nothing is gained by impugning motives, and the movement to recognize efficiency is so widespread that criticism on this score becomes quite feeble.

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[1] *Gas Age*, August 1, 1919, p. 100.

[2] *Proceedings*, National Association of Railway and Utilities Commissioners, 1917, p. 448. Italics not in original.

The question becomes one of practicability rather than of anything else and resolves itself into one of administration and motivation. Practical administrative difficulties are encountered at many turns. The definition of "normal efficiency" and the ascertainment of the extent to which a given utility may be said to surpass this normal, are exceedingly difficult tasks in practice. While costs figure very largely as the determinant, still, as has been seen before, there are many intangible and non-cost elements which are just as vital. If, in other words, eighty per cent efficiency is normal or "passing" or all that the public may reasonably be said to be entitled to, and if an attempt is made to grade all companies which appear to be above this and to grant them an increased return according to the extent to which they surpass it, no end of practical difficulties and complaints will ensue. And while perhaps no commission has yet attempted anything so explicit as this, nevertheless some such a system of grading is essential and the practical difficulties it presents must be overcome before success can be achieved for the broader scheme. We shall revert in the last chapter to a further consideration of these administrative difficulties.

Turning now to a discussion of the effect upon the utilities themselves of such expressions of desire on the part of the regulating bodies to recognize and reward efficiency of management, many interesting but illusive considerations present themselves. What, after all, really is the appeal which is made to the utility? Is it something definite, tangible, something worth striving for that is promised? Briefly, the commissions in certain jurisdictions (an increasing number, as we have seen) have said they would like to reward exceptional management. Do the utilities take such pronouncements seriously? Are they pricked with unwonted ambition as they hear more and more about their commission's emphasis on efficiency? Here, as elsewhere, it is necessary to fall back largely upon differences in human nature and capacities to explain the results which we think follow. To some managements, such announcements will mean nothing, immediately or ultimately. Such managements are already prosperous and in need of no special stimulus from the state capital, or else are so discouraged by adverse circumstances, including their own inefficiency, that no special animation can be felt when such announcements are made. In fact, as has been shown, there is no question as to the efficacy of the negative side of this efficiency rating. The appeal is, then, especially to the management which already is fairly efficient and which by some extra effort may be able to push itself up to a higher plane of efficiency.

The promise of the commission is this: while we expect you to be at least as efficient as the average of companies in the state, we nevertheless will be willing to allow you a little extra return if you will prove to us that you are more efficient than the average. The strength of this appeal will depend partly on the position of the individual utility in the "prosperity scale"; thus if already earning a good return and not feeling that the commission will take this away from it, the small extra allowance will not make an appreciable appeal to it. It will also depend to a large extent upon the certainty that increased reward, if sought for, will follow upon an increase of effort or efficiency.

This consideration goes back to a principle of sound regulation which was set forth earlier in this treatise.[1] The fact that the utility cannot claim more than a fair return on the fair value of its property and cannot, therefore, at least under present legal interpretations, insist upon an enhanced return with increased efficiency,[2] the fact, in other words, that such extra return can be withheld, decreased, or entirely taken away by the commission which promised it, or otherwise jeopardized by a change of commission personnel, very largely diminishes the strength of its appeal.

Furthermore, there are changes from time to time in the general standard of efficiency in utility management. If so, how can adjustments of particular cases to this general change of conditions be anything but haphazard and beset with uncertainty? Again, the granting to a utility of an increased rate of return upon a showing of exceptional efficiency will result in an immediate increase in the market value of its securities. Certain "vested interests" will be created, contingent, however, upon the continued maintenance of this exceptional degree of efficiency. The difficulties involved in reducing the rate of return with a decline of efficiency are manifold, especially where the utility's securities have changed hands considerably in the interval.[3]

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[1] Chapter V.

[2] See *Re* Lawrence Gas Company, quoted at page 294 above.

[3] This tendency to capitalize the rate of return allowed by the commission is referred in the following quotation from a decision of the New Jersey Supreme Court:

"A Commission, in allowing in a rate case a return of 8 per cent upon a certain valuation, does not really fix a higher valuation because of the fact that the income produced by the 8 per cent return will be capitalized in the public markets at 5 per cent in dealing with securities, where the 5 per cent capitalization is based on an unregulated rate." (Passaic *v.* Public Utility Comrs., P.U.R., 1915E, 625.)

It would be interesting and profitable if space permitted to work out a few arithmetical examples of the effect on earnings and on security values of various allowances in the rate of return for unusual efficiency. There are an almost infinite number of variables here, since the relative proportions of stock and bonds would have to be known in each case.

These considerations all seem to dampen the appeal of this new phase of commission regulation. On the general question of appeal to the various kinds of motive, little need be added to our earlier discussions. The pecuniary motive is principally, and in fact almost exclusively, appealed to. Little appeal is made to the motives which stimulate the individual manager, especially the non-entrepreneurial manager. Thus his feelings of professional zeal and social self-esteem are largely overlooked and a good opportunity for pointing out the duties to society which management owes is lost in a rather complacent appeal to the money-making instinct. The line of thought regarding the appeal of the emulative motive and the seeking for pecuniary gain in the case of the non-entrepreneurial manager, which has been developed previously on several occasions, is applicable here. The appeal by indirection is somewhat uncertain and therefore is not as effective as it might be wished to be. As was stated at an earlier point in this treatise,[1] the problem of the sharing between the utility and the management of the added return which increased efficiency may bring is a crucial one. If no practicable scheme for working such a division can be found, the suggestions contained in our last chapter will be seriously weakened. Final discussion of this matter will be left till Chapter VII.

Conclusions

All in all, then, it must be concluded that this particular method of stimulating efficiency is as yet in an early stage of development, that it indicates a groping after something which has not yet been found, in itself a hopeful sign but indicating the need for a great deal more application of thought and creative endeavor on the part of the commissions, the public, and of the students of public utility problems. An attempt will be made in the next chapter to show what can be done to round it out and make it more effective, as well as to show its relations to the other methods of promoting efficiency which have been dwelt upon in this treatise.

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[1] Chapter IV.

CHAPTER VII

ELEMENTS OF A CONSTRUCTIVE PROGRAM

The constructive suggestions offered in this chapter differ considerably in character. The successful application of some of them must await the maturer development of certain tendencies, presently to be reviewed, while others are of a character which permits of immediate application. It is necessary that this distinction be kept in mind, for otherwise the suggestions of the first type may assume an air of unreality and impracticability which, considered in their proper light, they do not possess.

Brief Resumé of Preceding Chapters

The preceding chapters have demonstrated that there is need for much sustained thinking on how a high order of efficiency can be maintained in the public utility industry. That there are marked differences in the degree of efficiency attained by various companies operating under substantially similar conditions, and that such differences tend to be cumulative, was shown in Chapter II. The situation with respect to the maintenance of efficiency is becoming more and more acute as economic conditions cause a high degree of productive efficiency to become increasingly necessary and as the enervating influences working to produce inefficiency are allowed to work on a larger scale with the spread of regulation and the broadening of the scope of the concept of what constitutes a public utility.

In Chapter III the causes — the inherent nature of public utilities, the regulation to which they are subject, differences in opportunities and differences in the capacities of individuals — explaining these differences in the results accomplished, were analyzed at length, as were certain contributory causes of a more ephemeral character. The problems of management, the classes or types of persons engaged in management, and the motives of each, were treated in Chapter IV. In Chapters V and VI there were analyzed all such devices or methods for overcoming inefficiency or promoting efficiency as have been used up to the present time. None is as yet a solution of the problem. The sliding-scale device has been criticized as being inapplicable under present conditions and as making the wrong kind of appeal. General economic conditions, particularly the probable future course of prices, and the general character of utility control and investment in this country at the present time, require a different emphasis from that contained in the sliding-scale device. Service-at-cost, with its devices for stimulating efficiency or warding off inefficiency, is yet in an early experimental stage; its positive contributions to good regulation and control, while not a few in number, are outweighed to a degree by the establishment of the agency relationship which service-at-cost necessarily entails. The recognition and promotion of efficiency in the regulatory process, the subject-matter of Chapter VI, is also in an undeveloped state at the present time, but, if handled properly, it promises much.

While, then, viewed in a large way, there is at present relatively little interest in the problem which is the core of this essay, signs are perceptible which indicate that the emphasis in the regulation of public utilities, which in the past has been more largely on the reduction of the return which goes to capital and business ability, is now being shifted to embrace the idea that greater good to all concerned will result from the establishment of conditions which will conduce to such an energizing of the agencies directing public utility undertakings as will lead to their making the fullest possible use of the means put at their disposal. The importance of human motives and of a knowledge of the instrumentalities whereby a proper motivation can be secured is being recognized more and more by the regulating commissions and by other students of the utility problem.[1]

Important Tendencies in the Public Utility Field

There are five interests involved in any consideration of the management of public utilities. These are the public served, the company-capital, the company-management, labor, and the regulatory agencies. The public served and labor, being most readily disposed of, will be treated first.

The public's interest is primarily in service which is good as to quality, quantity, and variety, and low as to cost. It is commonly not interested, although it always should be, in how such service can be rendered. At times it has insisted that service be rendered at a loss. Such an attitude is unfortunate in every way. Education on this point, on the benefits of coördinated service and as to the wisdom, or unwisdom, of requiring an increasing amount of "non-paying" service, and on other related matters, is doing much to create an understanding of the elements of the problem of rendering good service at low cost. Much improvement on both the public and the company side, the one as necessary as the other, has been made in recent years, and it is reasonable to expect further improvement in this respect with the passing of time.

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[1] This change of attitude is, of course, not as widespread and as thoroughgoing as we should like it to be. A prominent state commissioner who has read this essay has objected that the implication is carried throughout that the state commissions have been remiss in the performance of their duties, whereas the heavy burden of work which must be done by them to keep their dockets clear renders attention to such matters difficult. The implication stated is one which was intended to be conveyed, and at times there has been more than mere implication on this subject. The objection mentioned is real, so far as it goes. State commissions do not have unlimited appropriations and it is with difficulty that they obtain means enough to perform the most pressing of their work. That larger appropriations cannot be obtained is in part a reflection on the efforts of the commissioners, but more largely is it a reflection of the general condition — political, economic, educational — in the state, to which reference has been repeatedly made. If the result to be accomplished is a desirable one, then means must be provided for bringing it about.

As has been pointed out before, the public interest, while of first importance, is yet inarticulate except as to criticism. The public rarely makes a constructive suggestion; from its very nature, lacking in technical knowledge and practical experience, it cannot be expected to do so. It must, therefore, for the most part rely on experts, particularly the state commissions, to protect and promote its interests. It therefore should encourage intelligent and unbiased study of utility problems, for by so doing it will advance its own interests. It should be willing to accept and act upon the advice of the expert and restrict its own judgments to matters of general principle. There is improvement in this respect also in late years.

Labor has been granted recognition as an independent interest in the management of industries only of late years. The reasons for its greater prominence now and for anticipating increasing emphasis upon it in the future have been stated at an earlier point. Labor is dedicated to production and has as great an interest therein as has capital or management. An intelligent labor policy does not sympathize with lax methods of production and wastefulness, even if the industry, in the heyday of its youth or in the gamble of a competitive career, is able to reward its employees reasonably well. Thus, for example, labor demands a more intelligent and less individualistic operation of our coal industry, as it has also done in England. A real management of the coal mining and distribution industry will, it is seen, protect it, our natural resources and the general public from exploitation, much of which benefits no one.

But, in keeping with certain limitations laid down at the outset of this study, it is not intended to dwell at length upon how labor can be made to contribute more fully and intelligently to public utility operation of a high order of efficiency. This problem is one for the management to solve and, of course, it is neither so acute in the utility field as it is in other industries nor one permitting of such far-reaching changes. There is, nevertheless, abundant opportunity for management to work out means whereby it can secure the maximum coöperation of labor in progressive, efficient management. That much can be done is evidenced by the efforts of certain American railways and by the efforts of isolated individuals in the public utility field.[1]

A particular aspect of this problem is that of enlisting the interest of labor through making it a part owner of the business. The sale of utility securities to employees has been carried farthest in the telephone industry. The greater permanence and security of utility investments and the public character of the business itself make this device, always a propitious one, particularly adapted to public utilities. But this is, of course, a problem which, by intention, is left to management.

General Change in Character of Public Utility Investments

There is in process of coming about a general change in the character of public utility investments and management. Speculation and financial control are necessarily going to give way, in large measure, to a non-speculative basis of utility operation. This statement is made reservedly and not without hesitation. The evidences substantiating it have been presented in Chapters III, V, and VI, and at other points. Already, as was pointed out in Chapter IV, approximately one half of the capitalization and probably a much larger percentage of the actual investment of public utilities in this country are represented by funds secured in return for certain contractual obligations — a guaranteed interest and a guaranteed return of principal upon the expiration of the investment period. This guarantee is, legally, only that of the company itself, but, in an economic sense, even at present it represents in a measure a guarantee of the public, and it will be increasingly so as time goes on. The distinction between stocks and bonds will break down even further than it has at present, the newer form of capitalization retaining some of the control features of stock while taking on more of the guaranteed feature of bonds. Eventually all but a minor portion of the invested capital of public utilities will be guaranteed by the public against loss. Funded debt and fixed charges will then hold no special terror for management.[1] There can be no alternative; for to allow only a non-speculative return on the investment, the objective of all regulation, and yet not to guarantee that return is for the public to attempt to eat its cake and have it too.

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[1] Mention is made hereinafter of certain devices, actually used or proposed, for enlisting a greater degree of interest of labor in the problem of securing maximum production.

Recognition of this profound change in the character of utility investments will work several important changes in utility operation and regulation.

The control of the investment — where, when, and how it shall be made — will be in the hands of the public, through its experts, the regulating agency, and of the management. Capital as such will not be interested in the form or manner of its application. Management will account to it only for its maintenance intact and the public will guarantee it its annual return.

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[1] This guarantee is, for all practical purposes, contained in section 15a. of the Interstate Commerce Act, as amended on February 28, 1920. Sight must not be lost of the fact that the "guaranteed" return would not or should not be given to an inefficient company. The public has the right to expect a fair average of managerial efficiency. If the return to management is less than that which goes to the management of competitive enterprises this standard could not be above the average of efficiency in competitive business and probably would have to be slightly lower. If the efficiency of a given utility falls below this average efficiency it may be necessary to penalize the investor for inefficiency on the part of management. In this way improvement will most effectively be brought about, since, having nothing to gain by unusual efficiency but much to lose by inefficiency, there would be little delay in seeking improvement. As has been said at various places, the fear of loss of what one already has is a more powerful incentive to action than the hope of gaining something in addition to that which one already has.

Being a contractual arrangement it will be possible to secure investment capital at an appreciably lower rate of return, a source of considerable saving to the public. It will be necessary to vary the rate of return on capital with the condition of the investment market at the time the respective portions of capital were contributed, as is the practice now with respect to that half, approximately, of utility investments which is contributed on a contractual basis.

But will there be no real "share capital," capital seeking a more or less speculative investment? There will always be the risks incident to developments in new fields of service. These risks the public cannot be expected in the first instance to underwrite, except in so far as they are incidental to the everyday operation of the property. Risks of the latter sort are, of course, of minor importance. Developments in new fields should be made by private capital, somewhat uncontrolled, with the option, to be exercised by either the company or, after a reasonable period, by the community, of conversion of the securities outstanding against the project into quasi-public obligations. Legitimate losses sustained after either the public or the company has exercised the option of conversion should be amortized through rates, and, so far as practicable in a given situation, legitimate losses sustained prior to this time should also be amortized. In this and other ways, the public should encourage pioneering and other forms of new developments. Otherwise only atrophy can result.

It should be borne in mind, at this point, that this discussion, which is of a general character, is related more to the future than to the immediate present. It follows along the lines of cold logic and necessity. While the process of change is a slow one, it is yet unmistakable.

Increased Emphasis on Management

The change in the character of the capital invested in utility undertakings must, *pro tanto*, result in a change in the emphasis in utility management, and if logic does not mislead us, there is no other place for the emphasis to be put than upon operation and operating technique. This most desirable change, together with the aforementioned lowering of the cost of capital consequent upon its assuming somewhat the character of a public obligation, are two far-reaching and fruitful results of these latter day developments in the utility field. Both make possible large savings to the public, unless, and this is a fundamental consideration, there is an offsetting loss of efficiency. Capital therefore becomes merely a sustaining or nourishing rather than a directing, energizing force. Management thereupon assumes new responsibilities and complexities. Its functions must be clearly defined and related to that other managing agency, public regulation.

This increase in the emphasis on management will accomplish two further results. It will make the connection between cause and effect — between its efforts and its rewards — a direct and more certain one; it will also make possible a greater specialization on the private and public aspects of managerial problems. Management will be held accountable to the public, to capital and to labor, for the most part through the regulating agency, for the proper discharge of its functions. Left a reasonable amount of freedom of initiative, it will be as enlivened and enriched as capital is correspondingly rendered impersonal and inert.

The remaining interest in efficient utility management is regulation. Unless there develop some far-reaching change in the character of utility operation, such as a shift to public ownership and operation or private ownership and public operation, neither of which is likely to occur on a large scale, there will be no revolutionary change in the character of public utility regulation. It will necessarily expand in scope and power and in its managerial aspects. What should be done to improve the general character of the regulating agencies and of their work and what further things should be done by them to improve the character of utility operation will be set forth at a later point.

The Reward for Superior Efficiency should go, not to Capital, but to Management

All of the methods of promoting efficiency which have been analyzed in the preceding chapters have made their appeal directly, if not solely, in fact, to capital and not to management. It has been for this reason that some of them have been criticized so severely, for it is difficult to foresee any substantial solution of the general problem of bringing the reward for superior efficiency into an intimate and proper relation to capital. The reasoning here is based partly on theoretical and partly on very practical considerations.

Capital is contributed to utility enterprises from a great number of sources, and represents, directly or indirectly, the investments of large numbers of individuals who never participate in any way in management. Their interest is principally in dividends or interest and the security of their investments. When to this fact there are added the further facts, already enlarged upon, that the capital invested in utility operation is assuming more and more of the character of an assured investment and that regulation is to an increasing extent sharing the function of management, there can be no mistaking the conclusion that to reward capital as such through allowing added returns for a show of increased efficiency of operation is both gratuitous and impracticable. So to reward capital would be gratuitous, for capital would thereby receive a return for a contribution which it itself did not make. It is to management and not to capital that we must look for increased efficiency, and it is to management, the human, personal force and that which alone is able to respond to the offer of a special reward for especially meritorious effort, that the appeal of a reward for efficiency should be directed.[1]

In further substantiation of the foregoing argument, the cogency of which will become more apparent if one bears in mind the forces which are working a realignment of the factors playing upon the management of public utilities, and as one looks into the future, there are certain practical administrative difficulties which militate against giving the reward for efficiency to capital. These difficulties have been touched upon before. There is first of all the difficulty that any increased return to capital as a reward for efficiency is at once "capitalized." As soon as this process has taken place the stimulus to increased effort is gone. If, to continue the incentive to efficiency, successive stimuli, in the form of repeated increments in the return to capital, are resorted to, just as stimulants in increasing quantities are given to keep up the heart action of a failing person, these also will be successively capitalized, and in any event so to increase the stimuli would work no advantage to the public.

The word "capitalization," while expressing a simple business practice, is used in a somewhat technical sense and may therefore require further explanation. A utility company, being operated, in a given year, with only an average degree of efficiency, is allowed, let us say, a return of six per cent on a commission's valuation of its property of $12,000,000. The return on the investment, over and above all operating expenses, is therefore reckoned at $720,000 per annum. If, to simplify the example, it is assumed that the utility has only capital stock outstanding and this of $15,000,000 par value, and that the market rate of return on this type of investment is five per cent, the utility's stock would be worth, other things being equal, $720,000 capitalized at five per cent, or $14,400,000.

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[1] The only exception to this general rule is found in the fact that new ventures of large magnitude, the object of which is the attainment of greater efficiency of operation, require not only the investment of mental power and energy but also capital. To the extent that capital underwrites such risks some part of the resulting increased efficiency is attributable to it. The manner in which such vestiges of "share capital" should be treated has been set forth in a preceding paragraph.

If, however, by some demonstration of superior efficiency in a later year, this company's rate of return is increased by the commission from six to seven per cent, its actual return on its valuation, a constant, would be, not $720,000, but $840,000 per annum. If the market rate of return continues to be five per cent on this class of investment, the utility's capital stock would immediately be considered to be worth $840,000 capitalized at five per cent, or $16,800,000. The enhancement of its market value, in the amount of $2,400,000, represents, therefore, the capitalization of the one per cent increment in return.[1] The effect of this process of capitalization, so far as it takes place in practice, would be to reduce the *actual* return to new investors to the market rate of return, and, even in so far as the process is merely a mental one of the original investors, who still hold the utility's securities, there is something of the same effect, since there is a tendency to appraise one's assets at their highest marketable figure and to consider this added value as permanent. Once the increased valuation of the securities has been made, there is a desire and in fact a determination to retain it against all odds and all changes of circumstances. In either case, then, whether the process of capitalization results in an actual transfer of securities at an increased price or is merely a writing up of one's assets, there develops a situation in which the return to capital is, or is considered to be, merely the market rate of return on such investments. Under such circumstances the only incentive to the maintenance of even the present level of efficiency is the fear of a reduction of the return earned. This fear is not, however, as real as this theoretical discussion of the problem implies.

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[1] As a matter of fact the full seven per cent might not be used by all potential investors as the basis of determining the market value of the securities, since the added one per cent might be discounted slightly as a protection against the contingency of a reduction of the return upon the reduction of efficiency. But such discounting would tend to be rather slight.

Another point developed by this example is the fact that the increment of return as a reward for superior efficiency may be smaller, in absolute amount, when it goes to management than when it goes to capital. The one per cent increment used in this illustration is possibly high, although some commissions have used that figure. The added $120,000 in annual return to investors is, for a company of this size, no small amount. If the management is rewarded, half that amount might suffice to reward both the management and such of the employees as the management desired to share this reward with. No attempt has been made in this essay to study the specific increments of reward which are necessary to produce the best results. A study of this detailed problem awaits upon further discussion of the general problem of rewarding efficiency. It is to be borne in mind, however, that the actual amount of the reward, while important, is possibly not so important as that there should be an opportunity for management to produce results and to be given recognition for so doing.

Returning to the main line of this argument, in the event of the regulating agency determining, after an interval, that a reduction in efficiency has taken place, and that therefore a reduction of the return on the investment should follow if the public is not to pay for something which it no longer receives, it would be confronted with the very serious problem of having to destroy in a wholesale manner that part of the capitalization of utilities which represents the capitalization of the reward for efficiency.

In so far as this capitalization had come to represent *bona fide* investments of persons who had acquired a utility's securities subsequent to the increase in the rate of return, to destroy it would, from the investors' point of view, be tantamount to confiscation of property, for it is impossible, apparently, to keep apart the two elements which would make up the capital value in the instant case, the normal return on the investment and the added return allowed as a reward for efficiency.

This particular difficulty, the importance of which detracts greatly from the probability of the success of such devices as the sliding scale and certain of the special devices for rewarding efficiency which were contained in some of the service-at-cost franchises, and which requires a thoroughgoing change in the way in which the regulating commissions should reward efficiency, is disposed of in an eminently satisfactory manner when the reward for efficiency goes to management. As a medium through which the energizing force of special reward for special efficiency is transmitted to all the lower strata of labor, management, which is itself a form of labor, creates no vested interests. Each day is a new day with new beginnings and possibly strange endings. If an average efficiency is adequately compensated for, the removal of the reward for unusual efficiency upon the reduction of actual efficiency to only the average, would work no hardship to management, on the assumption, of course, that management was responsible for the reduction of efficiency. It is in fact this very directness, immediacy of the connection between effort and reward which recommends the suggestion here made for favorable consideration.

How shall Management be Rewarded?

(*a*) *Motives*

There have been many proposals, especially of late, having for their object the furnishing of some inducement for efficient management.[1] The number of these proposals and their recency are indications that thinking on the problem about which this essay centers is being done by many people, of different bents and proclivities, and that progress will be made despite many difficulties. For while giving the reward for superior efficiency to management rather than to capital obviates certain difficulties, it brings in those other, but lesser, difficulties which the variable and complex character of management involves. In the discussion which follows the distinction between suggestions for the future and those for immediate application begins to break down, until at the end of this chapter the discussion is entirely given to matters which can and should be undertaken at once. The distinction between the entrepreneurial and the non-entrepreneurial manager, to which much attention has been given in preceding chapters, need not be abandoned, provided it is borne in mind that with the change to a strictly non-speculative basis of utility operation there will be a corresponding increase in the functions of the non-entrepreneurial manager and a decrease in those of the entrepreneurial manager.

The several proposals and discussions listed above vary greatly in importance. The one of Whitten is the most extensive and carefully worked out. Whitten proposes what he terms a "merit rating method" of utility regulation, whereby companies would be rated on their performance at intervals of five years and allowed a profit based on their respective grades. This proposal, which is based somewhat on Whitten's observations of English direct profit regulation, is worthy of serious attention, since in it there are developed certain principles of general application. Inasmuch, however, as under this plan the reward for efficiency would go directly to capital and not to management as such, it is not necessary to enter upon a discussion of the plan. The same objection with respect to the placing of the reward applies to each of the other proposals listed, except in so far as some rewarding of labor through "bonuses" and other devices is either expressly suggested, as in the plans of Peters, Edgerton, Fitzgerald, and the Southern California Edison Company, or possibly is to be implied from or is not inconsistent with the plans of the others. It is true, of course, that in so far as capital and management are centered in the same person or group of persons there is an indirect appeal to management. This overlapping of interests, which is not unmarked at the present time, is, if our prediction with respect to the changing character of public utility investments is correct, certain to diminish and in time will almost wholly disappear. But this overlapping, in so far as it does exist, does not detract from the importance of the suggestion here made or from the force of the objections to rewarding capital.

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[1] A few only of these proposals or discussions of this problem can be cited here, as follows: Whitten, R. H., *Regulation of Public Service Corporations in Great Britain*, 1914, pp. 227–31; Peters, J. S W., "A Suggested Sliding Scale of Dividends for Street Railways Determined by Quality of Service," *National Municipal Review*, 1913, pp. 31–38; Rosa, E. B., *Coöperative v. Speculative Management of Public Utilities*, 1918; Cummins, G. C., "Participating Franchises for Public Utilities," *American City*, March, 1920, pp. 287–89; Edgerton, E. O., "Public Utility Financing," *Electrical World*, May 8, 1920, pp. 1069–71; Lincoln, E. E., "Control of Return on Public Utility Investments," *American Economic Review*, December, 1916; Fitzgerald, T., "An Incentive for Good Management," *Electric Railway Journal*, May 15, 1920, pp. 1000–01; Fleming, S. W., Jr., "Rewarding Ably-managed Public Utilities," *Electrical World*, November 4, 1916; Metcalf, L., "Some Observations upon Public Regulation of Water Works," *Journal of American Water Works Association*, March, 1916; proposal of Southern California Edison Company in *Re* Southern California Edison Company, P.U.R., 1921D, 65–92.

A further characteristic of each of the foregoing plans is that the appeal of each is principally, if not solely, to the pecuniary motive. The same was found to be true of the several devices described in Chapters V and VI. That the appeal should be solely to this motive is readily explicable, since the other motives do not permit of that solid, convincing argument which the reformer must present if he is to meet with success, and since the reward was intended to go to and be in terms of capital, to which such motives as emulation, professional zeal, and the seeking of social self-esteem are as dead phrases.

To be sure, the principal appeal, even to management, must always be, apparently, to this motive. There may, however, be a much larger measure of use of the non-pecuniary motives when the emphasis is placed on management rather than capital. With the transition to management as the recipient of the reward for superior efficiency there are the possibility and the need of making the appeal as broad and inclusive as possible. If management is becoming to an ever greater degree a recognized profession with traditions and sanctions and educational and personal requirements of its own, it will be possible to rely more largely on the professional spirit, the emulation of persons having a feeling of kinship and yet who are engaged in a process of rivalry and personal competition, and the promptings of the seeking for social self-esteem which will come in greater measure with the fuller recognition of the social duties and responsibilities of management. There undoubtedly will be a very large growth of thought in this direction. It may, then, be concluded that all four of these motives will serve as the source of such activities on the part of management as must be looked to for the solution, not alone of the problem of public utility management, but of management in industry in general. In individual cases the relative force of the different motives will vary a great deal; in some cases one motive alone will be in play, in other cases more than one. It is only when one looks over the entire field of management that the full operation of all four types of motive can be seen.

What has been said applies with particular weight to the non-entrepreneurial manager. The entrepreneurial manager is amenable more to the pecuniary and emulative motives, for the reason that he deals largely with pecuniary values and is engaged in the most arduous form of personal competition. Education and the growth of established managerial traditions will, however, offset this predilection to some extent. In the case of the non-entrepreneurial manager, on the other hand, the pecuniary motive, while of great importance, gives way somewhat to emulation, professional zeal, and the seeking of social self-esteem. This shifting of values is due partly to the relatively less opportunity for the employed manager to acquire enough wealth to make the seeking for it a prime motive of life, and partly because he deals more largely with the human and mechanical forces of industry and reckons his success in some measure in terms of the efficiency with which he directs them. As was pointed out in Chapter IV, it also is necessary to classify the employed managerial group in some manner according to age and success achieved or likely to be achieved. It also is to be remarked that no special consideration is being given to so-called altruistic motives, for reasons set forth in Chapter IV, although such motives may, in certain instances, be of great importance.

(*b*) *The Measurements of Results*

Having supplied the motives and having described in previous chapters the kinds of problems which management has to deal with and the general environment — economic, legal, political — in which it has to work, it is necessary, next, to establish some method of ascertaining to what extent individuals measure up to the demands made upon them. Motives, achievements, rewards — these are the successive steps in this discussion.

The measurement of results achieved involves a standard of some kind and a method of comparing individual performance with it. Standards and statistics are, therefore, the two basic needs. How poorly supplied with either we are at the present time has been shown in earlier chapters. Nevertheless, both must be had, and if they are not available now they must be made available, for obviously any scheme of special rewarding fails which cannot measure the results of the efforts of individuals.

A few principles may be established first as to the standard. (1) The standard of performance should be established at some point between the maximum efficiency attainable and average efficiency attained. To require maximum efficiency would obviously be impossible; to require only average efficiency would tend to depress the whole level of performance. Where the standard is set between these two limits will depend on a very careful balancing of many considerations. Probably that standard should be adopted which is sufficiently above the average to call forth, but not so high as to discourage efficiency on the part of the great number of individuals concerned to attain it. (2) A standard is not a homogeneous thing, but a composite reflection of each of the many problems whose solution constitutes the problem of management. The determination of a standard involves therefore a study of the problems of management, the classification of utilities by types, and the collection of exhaustive information. Engineering data, cost data, performance records and other statistical information of the most detailed and varied kinds must be developed. All of these are huge tasks and require prolonged study. (3) Performance may be of two kinds: routine and creative. The former is administrative largely and requires principally energetic supervision and keeping up with advances in the industry. The latter requires a special type of gift. It shows itself in the planning of important developments, in creating a well-organized, going establishment, and in devising new ways of handling old problems. It is a kind of "thinking for the sheer joy of it," to use Parker's expression. Performance of this kind should be considered of greater value than performance of the first kind, other things being equal. (4) Standards should be dynamic, [illegible] they are in competitive industry. In only this way can continual progress be maintained.

In the collection of the data upon which standards are to be based, there is first the problem of overcoming inertia, indifference, and open hostility. Assuming that these obstacles can be overcome by educational efforts, the next step is the making of surveys of conditions as they are at present. The state commissions are logically the agencies to undertake this work. These surveys would embrace the study of the problems peculiar to each type of utility and of those peculiar to the individual establishment. Engineering and commercial development of the utility, economic and social conditions of the community served by it, topography, nearness to natural resources, the possibilities of coördinating utilities, franchise problems, other public relations problems, all these and countless other things suggest themselves as subjects which should be included in such surveys.

The next step would be the classification of the problems and of the utilities in relation to them. The experience of Wisconsin in rating utilities, discussed in the preceding chapter, suggests possibilities of this sort.[1] The classifications of utilities according to volume of business done or size of community served which have already been developed by the commissions of those states which have a large number of utilities of varied sizes also suggest possible points of departure.

With the problems analyzed and the classifications developed it would be necessary next to establish standards on the principles outlined above. These standards would have to be different for each of the groups or classes established.

There are already the beginnings of the establishment of such standards of efficient management. Thus, in the case of General Service Company, the Indiana Public Service Commission said:

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[1] For an illustration of what might be done in the way of classifying local conditions and individual companies, see Barker, H., *Public Utility Rates*, pp. 334–36.

> Such expert evidence in the hearings of more than thirty rate cases, and records of operation of all such utilities in the state, established pretty definitely a standard of efficient operation as measured by pounds of coal consumed per square foot of radiation per season. Petitioner's plant is operated in a compact area. Considering this and other conditions of service, the Commission is of the opinion that eighty pounds of coal consumption per square foot of radiation per season should be the maximum allowance for coal, until such time as petitioner has presented records of accurate and acceptable tests covering a heating season.[1]

Again, in the case of Morenci Water Company the Arizona Corporation Commission said:

> A water plant is operated and maintained at a high efficiency where the total loss in pump and line constitutes but 5.75 per cent of the total amount of water displaced.[2]

Such statements are found in increasing numbers, and together with the unpublished data of the commissions and the companies, could very properly serve as the point of departure in the establishment of standards. Other more general standards are also found as to what constitutes proper development of business in territory served, proper design of plant, etc. In the French railway and Paris electric railway agreements, presently to be described, there are two simple criteria of superior management — development of business and decreased costs, increased gross revenues and a decreased operating ratio.

Much assistance in the establishment of standards could be obtained from the large utility companies and syndicates. The latter especially have at their command the results of the operation of many properties, in different localities and over a period of years. Thus one large syndicate which operates over one hundred and twenty electric, gas, and electric railway properties, keeps in the closest and most helpful relations with the managers of these properties through a budget device. This device requires the manager of each utility to submit, a year in advance, detailed estimates of revenues and expenditures. These are subject to comparison with the estimates of other managers whose problems are similar and with the manager's own past performance. The results he obtains are later checked against his estimates, and discrepancies must be explained. In this way managers and the chief executive headquarters are able "to speak a common language" and to have some fairly definite standards by which praise and censure can be assigned. Just as the large utilities were of great assistance to the states in developing good accounting rules, so their intimate knowledge of and experience with standards of good operation would be invaluable if made generally available.[1]

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[1] P.U.R., 1920A, 501–02.

[2] P.U.R., 1915C, 525. Similar cases with respect to gas are New York and Queenstown Gas Co. *v.* Newton, P.U.R., 1921A, 530; Kings County Lighting Co. *v.* Nixon, P.U.R., 1921A, 737; and *Re* Lewiston (Me.) Gas Light Co., P.U.R., 1921A, 573; with respect to electricity, *Re* Fountain City Light & Power Co., P.U.R., 1921E, 119; and Customers *v.* Katonah Lighting Co., P.U.R., 1921E, 139. For a more general case see City of Bellingham *v.* Puget Sound Power & Light Co., P.U.R., 1921E, 7.

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[1] The greatest importance attaches to this question of the measurement of results. If the state commissions were to enter upon a thoroughgoing program of research and investigation it can safely be predicted that the results of their work in the form of complete and lucid statistical and cost data would, if properly followed up, in and of themselves and quite apart from the granting of special rewards, bring about a very appreciable improvement in the character of utility management. Having gone a long way in the direction of participating in utility management, the commissions should now go further and to a larger degree than at present advise, assist, reprimand, and encourage those companies which its studies show to be in need of assistance or reproval. These will be, as a general rule, the smaller companies, although by no means entirely so. The Board of Trade in England has supervised the original planning, engineering and financial, of utility undertakings with beneficial results. Assistance of this kind, too, is much needed in this country.

(c) *Form of Reward for Superior Efficiency*

There is little to guide one in determining the form which the reward for efficient management should take. In treating this subject major attention will be given to the pecuniary motive but without any desire to minimize the importance of the other motives.

The reward for superior efficiency might well take the form of an outright money payment, allowed by the regulating commission as an item of operating expense, proportioned to the degree of efficiency attained, and contingent upon the continued maintenance of this degree of efficiency. This compensation for superior management might be of very great size in the case of large utility undertakings.[1] Large rewards must be paid for unusually large accomplishments. It is also to be borne in mind that the management, as that term is used in this study, would rarely consider itself the sole source of such superior efficiency. The contribution of management is largely a better organization and energizing of the employees, from the highest to the lowest grades. How such a result is to be achieved is for the management itself largely to determine.[2]

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[1] As indicated in a previous chapter, the problem of what amount of reward is necessary to call forth superior efficiency, a truly fascinating field of investigation in both economics and psychology and business practices, is one which stands in need of much careful study. Thus the fact that men will devote themselves to their work just as energetically after a large reduction in remuneration as before, provided their personal competitors are similarly reduced, is an interesting illustration of what subjects could be embraced in such a study. There is the question of maintaining relative equities. The difficulty with such an attempt, which appears to have characterized utility operation of late, is that there are other lines of work offering greater rewards to which managements can escape. But to assume, as some doubtless would, that doubling the remuneration would lead to double the effort and to halve the remuneration would halve the effort is poor psychology and not common sense.

[2] "Here is a problem for the expert in railway economics. It may be that we need a Fred W. Taylor to supply the answer." Editorial, "Can the 'Piecework' System be applied to Electric Railway Management?" *Electric Railway Journal*, July 17, 1920, p. 100.

While the relation between the public, through its representative, the regulating agency, and the employeed or non-entrepreneurial manager is not so direct as it is in the case of the entrepreneurial manager, the method suggested is not inapplicable to this type as well. In so far as the public assumes to guarantee more and more the return on the investment, it must also enter into contractual relationships with management. For example, when the commissions recognize the validity of the 4½ per cent agreement between the American Telephone and Telegraph Company and its many local subsidiaries, and other similar arrangements whereby a local company is permitted to include in its operating expenses payments made by it to such an agency in return for engineering, financial, and other assistance, they are, by that very fact, entering into a kind of contractual relationship with management. In fact, in cases of this kind the management is to a large extent not local, in the sense of resident management. The fact should be squarely acknowledged that to a large extent syndicate management requires that the syndicate should receive the reward for superior efficiency. While agreements such as the one in the telephone field are troublesome and the commissions and the public are always more or less suspicious of them, yet they must be and are being recognized as legitimate and necessary.[1]

In so far as the change in the general character of utility investments to which attention has been called in this chapter is not fully realized, it may be possible to rely largely on salary agreements between company and management, approved by the commissions, whereby the management would receive the larger part, if not all, of the company's share of the reward for increased efficiency. This reward might have to be shared, of course, with labor.

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[1] The granting of such efficiency profits is sanctioned by the law. Cf. Foreman, C. J., "Legal Theories of Profits," *Political Science Quarterly*, vol. 33, pp. 184–209, June, 1918, especially page 207: " . . . there still remains sufficient legal authority for an efficiency theory of profits. That is, if we define efficiency profits as the gain arising from reduced costs of production, there are many decisions which in their general context would support this new concept of profits."

When taken in connection with the other means set forth hereinafter, there can be little doubt as to the practical efficacy of the appeal of such an incentive. The clearing of the field for action through the elimination of various restrictions and intermediaries, the concentration of responsibility in a greater degree in management, the definiteness and certainty of the appeal,[1] all tell in its favor. As pointing to the strength of this appeal, although not bearing directly on the form of it, the following may be quoted from a recent work on profit sharing:

> Probably few men employed on fixed salaries, even those occupying managerial and executive positions, are measuring up to their greatest possibilities.[2]

Profit sharing is particularly applicable to managerial employees because of their greater influence on the course of profits, their better understanding of business uncertainties, and the difficulty of measuring the results of their individual efforts. On this point the same authors say:

> Profit sharing possesses decided merits as a method of remuneration for managerial employees that is, those holding discretionary or executive positions, in both merchandising and manufacturing. . . . Ordinarily . . . the work of this class can be measured only by its influence upon profits, and therefore the managerial group is one to which profit sharing is peculiarly applicable. Participation in some predetermined ratio in the profits of the business . . . will generally cause employees in this group to exercise their imagination, foresight, alertness, vigilance, care and judgment, and those other qualities upon which the

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[1] It is necessary only to recall the tests, developed at an earlier point which should be applied to any method of special rewarding: (a) is it the sole source of special rewarding? (b) is it certain in its operation?

[2] Burritt, Dennison, Gay, Heilman and Kendall, *Profit Sharing*, p. 94. The word "management" here is used in a somewhat broader sense than it is in this essay.

efficiency of management depends, more actively than a system of fixed salaries or any other known method of remuneration.[1]

The only question which should arise as to the practicability of the plan proposed in this chapter is as to the possibility of establishing standards and measuring the results of individual effort. To the practical questions which this problem gives rise to some further attention will be given presently.

A number of business organizations have profit sharing arrangements with their employees, although, so far as is known, no public utility has ever specifically singled out the managerial group for special consideration in this respect. One occasionally finds a reference to "bonuses" paid utility managers, but such payments are commonly a form of profit in excess of the return allowed by the commissions. As such they are carefully scrutinized.[2] There are many utility companies which have bonus systems for their general run of employees.[3] The fact that these are used is indicative of the practicability of the plan here proposed.

Recent Developments in France

The suggestion here made has recently received the sanction which may be implied from adoption and use.

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[1] Burritt, Dennison, Gay, Heilman, and Kendall, *Profit Sharing*, p. 112. It should be noted that the opinion of these investigators as to the practicability of profit sharing for the general run of employees is decidedly less favorable than these quotations would suggest.

[2] Cf., for example, the following recent cases: *Re* Lansing (Mich.) Fuel & Gas Co., P.U.R., 1921C, 479; Blythe (Calif.) Chamber of Commerce *v.* California Southern Railroad Co., P.U.R., 1921E, 117; Koerbel *v.* Duff City (Pa.) Gas Co., P.U.R., 1921E, 807; *Re* Star Auto Stage Co., P.U.R., 1921D, 530.

[3] For example, Boston Consolidated Gas Co., New Haven (Conn.) Gas Co., Grand Rapids (Mich.) Gas Light Co., Washtenaw Gas Co. (Ann Arbor, Mich.), Brooklyn Edison Illuminating Co., Milwaukee Electric Railway & Light Co., United Railways of St. Louis, Los Angeles Railway, Pittsburgh, Butler & Harmony Consolidated Railway & Power Co., Manila Electric Railway and Light Co. This list is incomplete.

The French Transportation Act of 1921[1] and the new Paris electric railway franchise[2] embody grants to the companies and their employees as rewards for increased efficiency. The electric railway franchise is simply a leasing of the properties, now publicly owned, to private management for operation. In order to promote good management, which is defined "as consisting, in effect, of serving the largest population possible," there is provided a reward for increased business in the form "of a bonus of 0.75 per cent of the annual gross receipts up to 250,000,000 francs and of 1 per cent of the gross receipts in excess of this amount. From this fund must be paid the salaries of the executive officers and of the directing board and inspectors of accounts. . . . The rank and file employees will receive a premium equivalent to 4 per cent of the gross receipts from traffic and advertising." There also is provided "a reward for any operating economies that do not lower the standard of service. This reward may be expressed by the formula: $0.04 \times (R - 0.65E)$, in which 'R' represents the gross receipts and 'E' represents operating expenses as defined hereinafter. . . . If the earnings, after subtraction of the awards, permit an 8 to 10 per cent dividend on stock or addition to surplus, the extra above 6 per cent is to be divided between the department (of the Seine) and the company. If there is enough to pay 10 per cent or more, the department will get three fourths of the remainder." The lease is for thirty years but it may be annulled in any sixth year on two years' notice. There is a provision for the indemnification of executive officials with whom the company may have entered into long term contracts.

The conditions bringing about this arrangement, particularly the need for coördination of the service, and the arrangement itself, are very similar to those obtaining in the case of the French railways. It is not possible to enter into a detailed consideration of these matters. Briefly, through a Transportation Board and a Management Committee, the activities of the Minister of Public Works and the use of a general contingent fund, an attempt is made to put French railway operation on a highly unified and, as well, a substantially guaranteed, basis. To give each company and its employees "an interest in the development of traffic and in economy of operation" certain premiums are allotted.[1]

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[1] A convenient translation, by W. C. Huntington, is found in Trade Information Bulletin No. 3 of Bureau of Foreign and Domestic Commerce, Department of Commerce, under date of March 4, 1922.

[2] Abstracted in *Electric Railway Journal*, May 7, 1921, pp. 847–49. The quotations made are from this abstract.

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[1] "(A) Three per cent of the excess of gross earnings of the fiscal period over the gross earnings for 1920 (a) (it being understood that in calculating the earnings the part of the increase due to the rise in the base tariffs shall not be included).

"When the excess is more than 20 per cent of the earnings for 1920, the percentage will be reduced to 2 per cent.

"(B) One per cent of the decrease, compared with the fiscal year 1920, in the deficit of earnings with regard to expenditures, or if the earnings in the year under consideration exceed the expenditures, 1 per cent of the sum of such excess and of the deficit for 1920.

"Beginning with the fiscal period following the year marked by the establishment of equilibrium, i.e., where the total gross earnings of all the railroads are at least equal to the charges provided in article 15 hereafter, the premium calculated as in the preceding paragraph shall be increased, for each system, by 1 per cent of the amount of the reduction of the deficit, or of the increase in the excess compared with the fiscal year where the balance of all the systems taken as a whole was attained. . . .

"If an increase in the deficit of earnings as calculated according to the above paragraph occurs compared to the fiscal year 1920, a penalty of 2 per cent of this increase shall be applied. This penalty shall be deducted from part B of the premium for the following fiscal year, and if necessary the years following until completely amortized.

"If the total of the premiums A and B earned by a system according to the preceding paragraphs exceeds one third of the sum fixed in paragraph . . . (an amount fixed for each system), half the excess shall be paid into the general fund; if after such payment the excess is more than two thirds of the said sum, then two thirds of the new excess shall be paid into the general fund.

"The premium accruing to the employees of each system will be composed of the two independent elements A and B, calculated as stated above, but without taking account of payments to the general fund mentioned in the preceding paragraphs.

"The elements A and B shall be doubled until the premium accruing to

It will be seen that in both the steam and electric railway agreements there are the following essential elements, all of which have their counterparts in this country: (a) public control of rates; (b) public control of operating and other expenses; (c) a stipulated minimum return on the investment; (d) a need for providing, therefore, some special reward for special effort and superior efficiency. The capital investment of the operating company in the case of both the Paris franchise, a relatively small amount, and the large railroad systems is, expressly or otherwise, guaranteed a minimum return. No speculative profits are possible. It was necessary, therefore, if there was not to be created what has been termed a *régime désinteressé*, to inject some element of elasticity, some appeal to greater exertion on the part of management and men.

The basis upon which the premiums or bonuses are calculated is simple in the extreme and may indicate that great refinement, to which we are somewhat accustomed in this country, unnecessarily complicates a scheme which should, above all things, be easily understood and of as general application as possible. Nevertheless, it is not unlikely that conditions entirely beyond the control of the management and employees will arise which will reduce in large part the business done or run up operating expenses and therefore the operating ratio. To a certain extent adversities of this kind have a tonic effect, but carried too far they baffle and discourage. The merit of

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the employees represents 1½ per cent of the gross earnings of the fiscal year, serving [illegible] a basis for the calculation of element A. From that time on the employees' premium will continue to grow by the addition of the excess of the simple elements A and B no longer doubled.

"The amount of the premium shall be announced each year by the Minister of Public Works on the motion of the railroads and after the accounts have been verified.

"A decree reviewed in the Council of State and rendered on the motion of the Minister of Finance after hearing the opinion of the Superior Railroad Council will determine the basis for the distribution of the portion of the premium accruing to the employees." (Article 14.)

the plan proposed in this essay is that it does not proceed on such a rough, empirical basis, but permits of ready adaptation to changing conditions. Thus in the recent period of sharply advancing prices, or in the face of a coal famine or a general railroad strike, conditions which would affect all utilities somewhat alike, the commission could alter its standards or requirements temporarily. Since the interest is principally in the relative performance of the respective managements, compared with an ideal standard of expected performance, changed conditions beyond the control of managements can be taken into account without in any way disrupting the working of the plan. In other words, the commissions must develop practical standards and be willing to alter them as occasion demands. No scheme of special motivation will work which, made to function in an automatic fashion, fails to take into consideration the efforts of individuals and the interplay of personalities.

Also telling in favor of the practicability of the proposal made in this essay is the suggestion, recently made by the Southern California Edison Company, that it be permitted to create "a substantial surplus and a plan whereby a portion of this surplus and the savings to be derived through efficiencies in operation may be divided between its consumers, the employees and the company as a reward for efficiency."[1] In replying to the suggestion of the company the California Railroad Commission expressed its belief that "utilities, which are largely monopolies and therefore not subject to the same active competition as most industries, have less incentive to maintain high efficiency, and we, therefore, welcome a sound and logical plan whereby utilities and the public may share in the savings from efficiencies and economies in operation. Such a plan, to be effective . . . must contemplate a reward to employees as well, and should in its application result in improved serv-

[1] *Re* Southern California Edison Co., P.U.R., 1921D, 65–92.

ice and reduced rates to consumers." The Commission did not find the company in this instance "any more than reasonably efficient" and suggested therefore that it had sufficient margin to effect certain economies which would benefit it financially. The company's suggestion that increased profits be divided fifty per cent to consumers, twenty-five per cent to stockholders, and twenty-five per cent to the employees, was criticized as not making a distinction between increased profits arising from increased efficiency and those arising from conditions outside of the control of the management and employees. The Commission concluded that it is "of the opinion that a workable plan for the division of the savings due to efficiencies and economies on the part of the company or the employees is desirable" and "invites a definite and specific plan providing for the determination of the savings properly due to increased efficiency and for their division between the company, its employees and its consumers."

While, unlike the French arrangements described, there is in the California situation less of a fixed status with respect to capital investment and the return thereon, there is yet the same effort to enlist to the fullest degree the interests of the company and its employees. This plan therefore blends in with that suggested in this essay and, upon modification to bring its terms into accord with the tendencies with respect to capital and management hereinbefore described, is convincing proof of the direction in which things are moving.

The suggestion of Fitzgerald is very similar to the French methods in that he advocates granting the company an allowance or reward of a sum of money for each passenger carried. "With this reward in view the company will make every effort to provide service which will bring the largest number of car riders. The company's incentive to economy in financial as well as operating management is vital because any additional expense will increase fare, and increased fare will decrease riding."[1] The objection to this plan, which is obviated when the reward is made to management as such, is that it may, in given cases, set up a situation in which the company has little inducement to make relatively or temporarily unprofitable investments in new territory or to develop new demands. To meet this objection Fitzgerald suggests that an "allowance to the company per passenger could be proportioned to its success in completing capital investment required by the city."

While the regulating authorities should not interfere too directly in the development and application of such plans as the industries suggest as warranted by their experience, it would not be amiss for them to state in a general way the kind of scheme they would approve and what allowance would be made for it in the process of regulation. Indeed, a commission might well initiate plans of this kind, after careful study.

There is no desire here to advocate a wholesale adoption of "profit sharing" for the managerial employees of public utilities. Nevertheless, because of the peculiar nature of the utility business, some such method of calling out the best there is in the higher managerial employees may well be a desirable thing.

Non-pecuniary Rewards for Superior Management

Passing to the non-pecuniary motives, the essential requirement lies in the direction of developing real professional standards. The shifting of the emphasis to management and the greater concentration of responsibility in management mark great steps in advance, in that thereby management is thrown out in clear relief. The specific means for developing high professional standards are principally education, in the broadest sense, the definition of objectives, and a proper kind of publicity.

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[1] Fitzgerald, T., "An Incentive for Good Management," *Electric Railway Journal*, May 15, 1920, pp. 1000–01.

Whether managers come from the universities, and if so from the graduates of engineering or law schools or schools of business administration or the traditional college course, or are developed entirely in the course of actual employment, matters little. Some will always come from each source. But whatever the source greater stress should be placed on the problems peculiar to management and on the need for and kinds of professional standards. The practical difficulty with this suggestion, that it is impossible to determine which individuals have the essentials of the managerial type, is not serious, since education along these lines would be immensely valuable to any one, whatever his later developments may be. Such education makes for understanding, fellowship, and wholesome rivalry.[1]

Aside from the purely formal education and the less formal but no less formative education of the shop and office, there is that very informal, illusive education which comes from advice, unconsciously given in large part, handed down by the experienced to the novitiate, from an exchange of experiences, and from questions and answers. The best organizations encourage such means of education. A small part of such exchange of experiences and discussions finds its way into the meetings of national, state and local utility organizations and into the technical press. While as a rule on a commercial basis, the technical press in the utility field is progressive to a high degree and a ready means for the exchange of experiences, biographical records, and news.

It also is not unthinkable that special creative effort would be called forth if a national prize or a number of prizes were established to be given to those managers who, in a given interval, as a year, make the largest contributions to the science or technique of management in the utility field. While not wishing to stress this suggestion, it does give one an idea of the kind of rewarding we shall need to come to more and more. In other words, emulation, professional zeal, and the promptings of a seeking for social self-esteem must in increasing measure share with the pecuniary urge the motivation of our industrial leaders. Such a series of prizes, together with the establishment of standards and the educational program suggested, would serve, along with other things, to define the objectives of management, what is good or the best in management and what is mediocre or poor. Lacking in some degree that same fear of loss which characterizes the manager in the competitive field, the utility manager especially needs to know what is expected of him and when he meets this expectation.

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[1] In particular, education which is directed solely to technical engineering, legal or accounting and business problems, fails to develop all sides of the future manager. He needs breadth and vision as well as technical skill, for his contacts will be as much with labor, financial, political, and civic problems as they will be with strictly technical matters. Education can do much to bridge the gap to competence in these matters.

By publicity, the last of the means of developing high professional standards, there is meant something of a high order of truthfulness and technicality. By it is meant the dissemination, particularly among utility managers themselves, by some impartial agency, the state commissions, of information, based on adequate knowledge, as to the results attained by the managements of the respective undertakings. The Wisconsin grades are indicative of the thing here had in mind. The public, as such, is not especially interested in such grades, although it may take pride in a good showing by the managements of its local utilities or question the need for the continuation of a poor showing. If, however, the grading can be made effective, and there is no reason why, within reasonable limits, it cannot be made effective, it will serve as a definite, compelling stimulus to action. What this grading should consist of will be explained more fully presently.

A stimulated, freer, more enlightened management, with definite objectives, definite responsibilities and definite measurements of results, cannot but contribute much to the cause of efficiency in utility management. All of its motives will be called actively into play and, if the seeking for the pecuniary reward appears to be the most potent stimulant, sight must not be lost of the fact that behind it there is always that less definite and conspicuous but no less real striving to excel, to satisfy one's instinct for creation, to stand well in the eyes of one's contemporaries and associates, and, indeed, to serve one's day and generation to the full extent of one's capacities.

Constructive Work for the State Commissions

The methods of stimulating efficiency which have heretofore been described in this chapter are such as have their seat primarily in the utility industry itself or in the traits of human nature. So far as possible all the stimulation to special effort should be such as arises naturally out of the management of the industry. Such means are certain to have an air of greater reality than any which originate from outside. To be sure, the coöperation, sanction, and guidance of the commissions have been called for in the case of several of the methods proposed. It will be well, however, in view of the great importance attached in this essay to the state commissions as sources of improvement in public utility management, to round out this discussion and complete this essay with a few brief remarks on what these agencies can do to assist in the promotion of efficiency.

Viewed in certain ways, the state commissions stand somewhat in the same relation to the utilities under their jurisdiction as do the "headquarters staff" of the large utility syndicates. Each comes into contact with large numbers of companies, operating under varying conditions, and achieving varying degrees of success. To a large extent the revenues and expenses of these companies and other managerial aspects of their business are controlled by the commissions. If, as has been the contention throughout this essay, it is a duty of the state commission, not only to protect the public and the company from exploitation, but also to promote the welfare of both by advancing and initiating policies and means of improvement, then the state commissions can and should do much more than what was seen in Chapter VI to be done by them at present in the way of technical research work on the problems of public utility management.

Only the general outlines of such a program of constructive work can be set forth here; the details would vary somewhat with the locality and the time at which such work was entered upon. The need is for more light on the real nature of the problems of utility management — their origin, their importance, their solution. It goes without saying that the utilities themselves should be looked to principally for the solution of these problems and, indeed, certain of them, from the nature of things, do not fall within the purview of the commissions. The particular advantage held by the commissions is their opportunity to draw upon the experience of many companies, to compare the results of one company's operations with those of others, to ascertain the reason for the better or poorer showing, and authoritatively to suggest and at times to insist upon the use of such methods as they have found to be of benefit. Particular problems of utility management which suggest themselves at this time, aside from the establishment of standards and the collection of the necessary supporting statistical data, are such as advising on matters of engineering, including, in some cases, assistance even in the planning of original plant layout, matters of labor — forms of remuneration, education, etc. — forms of rate structures, service and safety standards, etc.[1]

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[1] For example, a middle western state commission, not a public utility commission, however, has developed information which has demonstrated the practicability of using certain coal resources of that state which had

Enough instances in which the commissions were shown at present to be engaged in such work in specific cases were given in Chapter VI to give assurance of the practicability of these proposals. The work of the state commissions described in Chapter VI under the heads of engineering and accounting assistance, the collection and analysis of cost and efficiency data, rating of utilities, and singling out efficiency or inefficiency in the regulatory process, all is in point here. The advance here taken is the suggestion that the commissions develop general work of this kind, meeting the problems of the utilities before they become acute, and finding remedies of general application. Peculiarly fortunate is the manner in which the suggestions made in this chapter fit in with what the analysis in the preceding chapter showed to be the tendency among the commissions in the matter of rewarding efficiency through some variation in the rate of return. While this method in its present form suffers somewhat from the objection that it gives the reward to capital and not to management, it would require no radical change of policy to give the reward to management, and thereby in part to the general run of employees. In fact, the interest in efficient management there shown to be prevalent among state commissions and the actual granting of an increased return for superior management in some cases, suggest very strongly the likelihood of the success of the plan here proposed.

Finally, with the lessening of the influence of purely financial control and the enhanced responsibility of manage-

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previously been thought to be unavailable for gas-making purposes. No one company had the foresight or the desire to develop this information. This work is leading to other similarly valuable work which is contributing much to an industry which is greatly in need of such research and developmental work. The fact that this work is being done by a state geological survey suggests the thought that the state utility commission would be expected, so far as possible, to draw upon those departments of the state government — the geological survey, departments of health, labor, taxation, etc. — which have peculiar technical fitness for studying certain special aspects of utility operation.

ment, as well as with the greater statistical and managerial control of the state commissions over the utility companies, there should develop some more definite knowledge of what degree of freedom and self-guidance can be permitted the individual management. Despite the emphasis here placed on certain advisory and control work of the commissions, the desideratum is the maximum freedom consistent with efficient and scrupulous management.

Although the suggestions here made might be construed to imply that each state commission should, single-handed, start out upon an independent program of constructive work, such would be an unfortunate beginning. The state commissions have a national organization, the National Association of Railway and Utilities Commissioners, of a long and creditable history, which now has standing committees on some of the subjects indicated above as fruitful things to study, such as rates, service, safety, valuation, capitalization and intercorporate relations, statistics and accounting, and, from time to time, committees on special subjects. It would be most natural, therefore, for the state commissions to coöperate, so far as there are not legal and natural obstacles to their doing so, in the formulation of general plans and in the exchange of experience. The national government could also do much to promote uniformity and to assist in the clearing of information. There are the examples of the Department of Agriculture and its assistance to the farming and other interests, the Geological Survey of the Department of the Interior and its survey of our power and mineral resources, the Bureau of Standards of the Department of Commerce, with its work on the development of utility service standards, prevention of electrolysis, etc., and the Bureau of the Census with its statistical reports, as indications of what the national government could contribute. But sight must not be lost of the fact that this work is principally for the states to accomplish; it should not sacrifice for the sake of uniformity any of the impress which local conditions should make if the work is to be of the greatest usefulness.

In view of the character of some of the state commissions the plans here outlined may seem somewhat illusory. That most, if not all, of the state commissions would benefit by a strengthening of their personnel, will generally be conceded by the commissions themselves. Constructive work of a high order cannot be expected of commissioners and their staff who are underpaid,[1] and unable, for a number of reasons, to look upon and train for their work as a specialized calling, and who are always standing in the shadow of the strong arm of politics. To an increasing degree the commissions and their staffs are sharing the management of public utilities. Obviously no direct pecuniary reward can be granted such public servants for a good showing of the utilities under their jurisdiction. There must then be a greater emphasis upon those rewards which come from the feeling of prestige and of service. Higher qualifications, longer and more assured terms of office, much larger salaries, a larger and better trained and paid staff — in a word, an opportunity to produce results — and public recognition of work well done, will supply in large measure the inducements to raise the state commissions to that higher plane of activity which the welfare of the people of the state and nation demands. A very great forward step will have been taken when we have convinced ourselves that capable, far-seeing public officials cost less than inferior ones.

Much remains to be done in the way of bringing theory and experience together. There is need for further study and much constructive thinking. The present essay is essentially an analysis of a problem. The constructive suggestions made in this chapter appear to be such as present knowledge and experience, and certain predictions based on that knowledge and experience, warrant. The object of the essay as a whole has been to draw the attention of the many students of public utility problems — regulators, utility operators, large and small, academic men and citizens — to certain profound changes which are coming over not only public utilities but also our entire industrial life. Old forces are giving way to new forces and old alignments to new ones. This essay, it is hoped, is suggestive of means of accomplishing the transition.

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[1] In 1920 approximately six sevenths of the state commissioners received less than $7000 per annum and approximately two thirds less than $5000; the term of office is rarely over six years and in approximately one half of the states is less than six years; in approximately one third of the states the commissioners [illegible] elected rather than appointed.

THE END

APPENDIX I

STATES HAVING PRESCRIBED STATE-WIDE UTILITY SERVICE STANDARDS

A. States having gas service standards [1]

Arizona
California [2]
Colorado
Connecticut
District of Columbia
Illinois
Indiana
Kansas
Maine
Maryland
Massachusetts
Missouri
Montana
Nevada
New Hampshire
New Jersey
New York
North Carolina
North Dakota
Oklahoma
Oregon
Pennsylvania
Washington
West Virginia
Wisconsin

B. States having electric service standards [3]

Arizona
California
Colorado
Connecticut
District of Columbia
Illinois
Indiana
Maryland
Massachusetts
Michigan
Missouri
Montana
Nevada
New Hampshire
New Jersey
New York
North Carolina
Oklahoma
Oregon
Pennsylvania
Rhode Island
Washington
West Virginia
Wisconsin

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[1] United States Bureau of Standards Circular No. 32, *Standards for Gas Service.*

[2] Not applicable to some large cities.

[3] United States Bureau of Standards Circular No. 56, *Standards for Electric Service.* 1916.

C. States having water service standards

Colorado
Connecticut
Illinois
Missouri
New Hampshire
New Jersey
Oregon
Pennsylvania
West Virginia
Wisconsin

D. States having central station heating service standards

Illinois
Indiana
Ohio
New York
Pennsylvania
Wisconsin

E. States having telephone service standards

Illinois
Wisconsin

APPENDIX II

SERVICE-AT-COST ORDINANCES, ETC.

Chicago:

Ordinance authorizing the Chicago City Railway Company to construct, maintain, and operate a system of street railways; passed by the City Council on February 11, 1907. Found in Annual Report, Board of Supervising Engineers, Chicago Traction, I, 211–68.

Cleveland:

Ordinance No. 48,845–A, passed April 7, 1919, granting a renewal of the street railway grants of The Cleveland Railway Company.

Kansas City:

An ordinance authorizing The Kansas City Railways Company to "acquire . . . , to construct, prescribing the terms of such grant . . . the manner in which the surplus income . . . shall be first applied," etc., passed by Common Council, June 15, 1914.

Westerville:

Franchise governing operation of the Westerville Division of The Columbus Railway, Power & Light Company, granted by Board of County Commissioners of Franklin County, Ohio, June 13, 1917.

Dallas:

Street railway and light and power franchises, effective October 1, 1917, Dallas, Texas.

Massachusetts, general:

An act to provide for service-at-cost by street railway companies, General Acts, Massachusetts, 1918, ch. 280, pp. 476–82.

Boston Elevated Railway Company:

An act to provide for the public operation of the Boston Elevated Railway Company, Special Acts, Massachusetts, 1918, ch. 157, pp. 172–83.

Bay State Railway Company:

Act relative to the Bay State Railway Company, Special Acts, Massachusetts, 1918, ch. 188, pp. 284–98.

Cincinnati:

Ordinance No. 253 — 1918, revising franchise of The Cincinnati Street Railway Company, passed August 23, 1918.

Youngstown:

Ordinance No. 21,945, granting franchise to The Mahoning and Shenango Railway and Light Company, passed December 14, 1918.

Montreal:

Contract between the City of Montreal and the Montreal Tramways Company, January 28, 1918, approved February 9, 1918.

Rochester:

Contract between the City of Rochester, N.Y., and New York State Railways, in effect August 1, 1920, as amended April 6, 1921.

Memphis:

Order of Railroad and Public Utilities Commission of the State of Tennessee, March 15, 1920, *in re* application of Receivers of the Memphis Street Railway Company for approval of increase in fares, in Report on Traffic Survey, by R. W. Harris.

Toledo:

Ordinance No. 1927, granting and renewing to The Community Traction Company (of Toledo) the grants, rights, etc. 1920.

Des Moines:

Ordinance granting to The Des Moines City Railway Company the right to construct, maintain, and operate a system of street railways, passed by city council October 24, 1921, approved by voters.

Ann Arbor:

Report of Commission on the Revision of Rates of The Washtenaw Gas Company, July 1, 1918.

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Statutes, franchises and ordinances.

Reports of Interstate Commerce Commission.

Bureau of the Census: Census of Electrical Industries (quinquennial), covering central electric light and power stations, street and electric railways, telegraphs and telephones.

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